

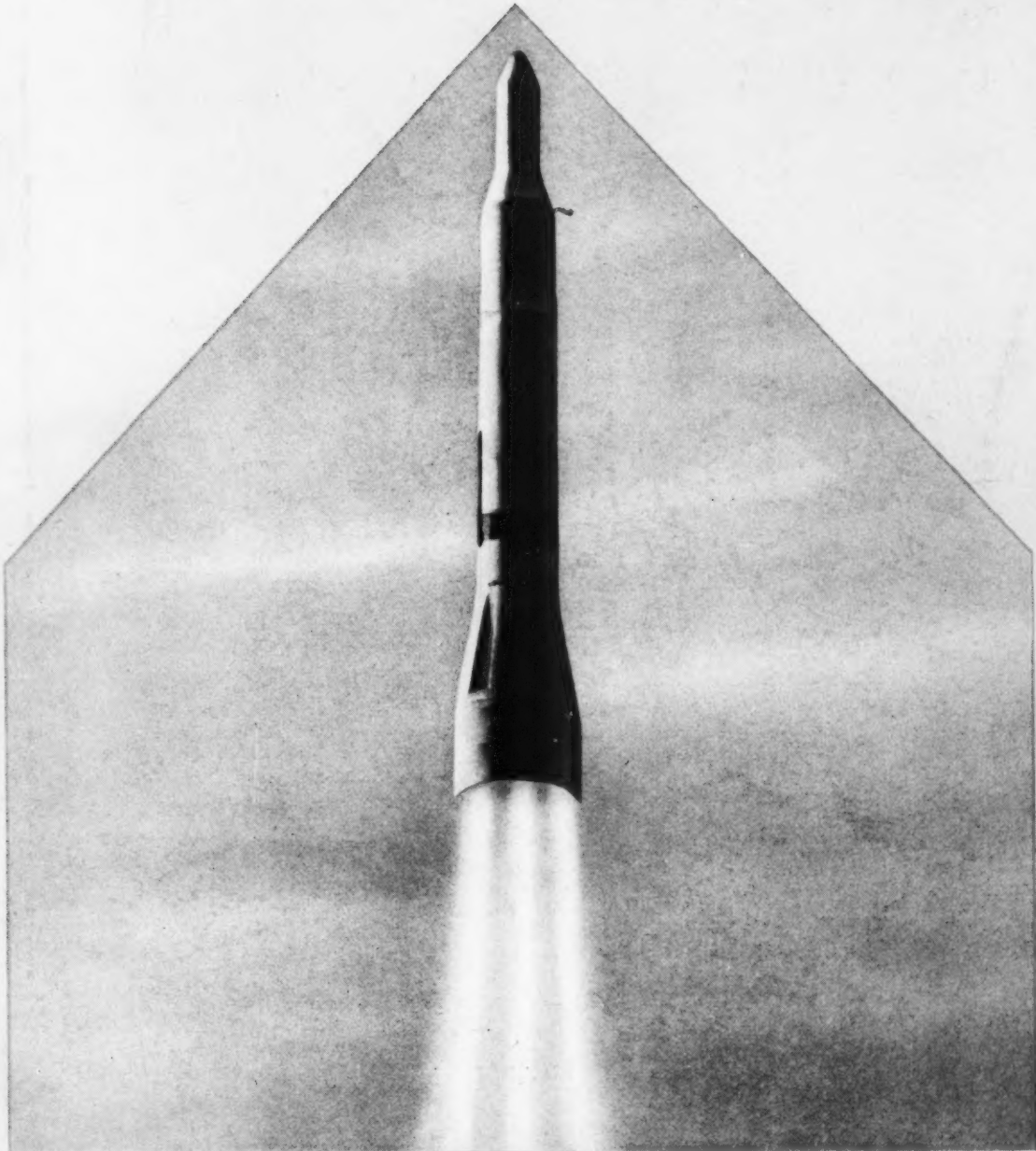
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December, 1958

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# **A**RMED FORCES management

PUBLISHED FOR THE ARMY, NAVY, AIR FORCE, COAST GUARD AND MARINE CORPS



**Why Polaris is Winning its Race Against Time . . . p. 8**

**Complete Contents . . . p. 3**



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For instance, ACF understanding of mass production techniques permitted efficient production of great numbers of aft fuselage sections for the B-47 "Stratojet".

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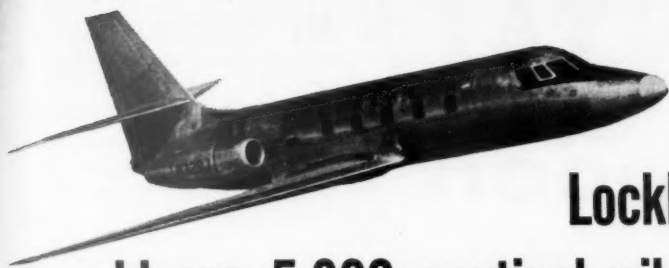
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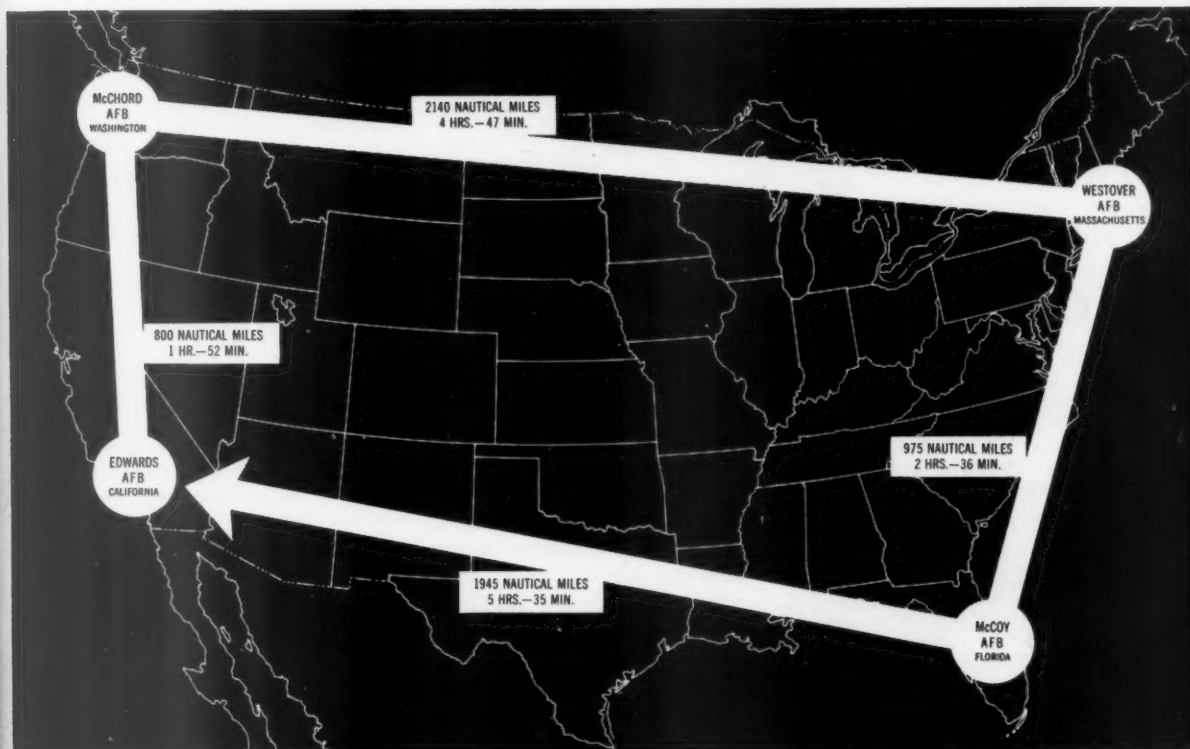
PROP-JET T

DECEMBER



# Lockheed JetStar

## blazes 5,860 nautical-mile jet trail around U. S. A.—in 14 hours, 50 minutes!



The Lockheed *JetStar*—an economy-size utility jet trainer/transport of sweptwing design—dramatically demonstrated its high altitude, long-range training mission capability by making a four-corners-of-America flight—in 14 hours, 50 minutes flying time (17 hours, 50 minutes elapsed time).

No special flight equipment was needed by the crew and passengers aboard the record-setting *JetStar*. They flew in fully pressurized, air-

conditioned comfort, at altitudes up to 46,000 feet, at speeds up to 596 knots. Due to the aft fuselage mounting of engine jet pods the *JetStar's* cabin was so quiet everyone could talk in normal conversational tones at all times and be clearly understood.

The *JetStar* was equipped for this flight with 640-gallon "glove" tanks—giving it a range capability of over 2600 nautical miles. The production model *JetStar* will offer choice of

either two or four engines, configured to use General Electric J-85, Fairchild J-83, Pratt & Whitney JT-12, or Curtiss-Wright TJ-37 power plants.

Military missions for which the *JetStar* was designed include: navigator-bombardier trainer, airways and air communications inspection, fighter-intercept trainer, high-priority personnel/cargo transport and several other critical missions.

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Lockheed Aircraft Corporation, GEORGIA DIVISION, Marietta, Georgia

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DECEMBER 1958

1

# CONTINENTAL Ground Support



## Boosts Air Time

Continental's TC-106 turbine air compressor, developed in conjunction with the United States Air Force, is now available for commercial jet liner ground support. The unit, supplying low pressure air, is especially suited to engine starting, cabin air conditioning and actuation of electrical generating equipment for ground operations of the aircraft . . . Continental Turbo-Compressors have been in operation with the Air Force for more than four years, compiling an enviable service record for dependability and long life . . . Continental's new Snow and Ice Removal Nozzle unit, designed to be used with the TC-106 air compressor, reduces man hours and material costs for ice removal from aircraft surfaces. Warm bleed air from the compressor is converted to a high-energy air shaft which erodes through the ice, lifting it from the surface and blowing it away. The Snow and Ice Removal Nozzle is equipped with a glycol spray attachment for quick application of anti-ice protection after the surface has been cleared.



SNOW AND ICE  
REMOVAL NOZZLE



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## In My Opinion

### McElroy Praised

Secretary Brucker has asked that I convey to you his compliments for a most vivid presentation of the fine job being done by our Secretary of Defense.

May I take this opportunity to commend you and your staff for the consistent excellence of **ARMED FORCES MANAGEMENT**, this is a fine publication.

*Maj. Gen. H. P. Storke*

Chief of Information  
Department of the Army

### Stimulating

It has been interesting to read the "ADSID" article sent with your letter of . . . It is a stimulating progress report, and I appreciate your sending it to me for examination.

*Donald W. Douglas, Jr.*

Office of the President  
Douglas Aircraft Company, Inc.

### Bouquets

Congratulations on your fine September issue, one of the best special EDPS issues I've ever seen. The Computer Comparison chart seemed to me an especially valuable survey. It was with regret, therefore, that I noted the omission from it of our Burroughs 220 computer. I hope that you will be able to include the enclosed information on the 220 in a future issue. I would also like to add that the "P" and "O" figures for the Burroughs 205 (formerly called the DATATRON) production record should now read 100 and 100.

My personal wishes for the continuing success of **ARMED FORCES MANAGEMENT**.

*Robert B. Forest*

Advertising/Public Relations  
Burroughs Electrodata Div.  
Pasadena, Calif.

Model 220 facts submitted by Mr. Forest: Applications—GP; Numerical system—bin coded dec; Input—PT, PC, K, MT; Memory—MC, MT; Output—Ty, PT, MT, PC, Pr; Power reqmts—30 KVA; Sq. Ft. Area reqmts—1200 ave. working area; Cost in \$1,000—320; Rental per month—\$7800; Production Record—first installation this month—Ed.

The vast numbers and increasing complexity of business machines make it mandatory to have some basis on

(Continued on page 4)

**ARMED FORCES MANAGEMENT**



# ARMED FORCES management

PUBLISHED FOR THE ARMY, NAVY, AIR FORCE, COAST GUARD AND MARINE CORPS

DECEMBER, 1958

Volume 5—No. 3

## FEATURES

- Why Polaris is Winning its Race Against Time ..... 8  
*A major reason for Polaris' success in beating deadlines has been a top-notch management control of the operation. This is how it works.*
- Sealift: A New Concept in Logistics ..... 12  
*Martin's P6M SeaMaster may be the military answer to logistics mobility. This is why.*
- How Graphic Displays Speed Aircraft Maintenance ..... 14  
*Marine Corps Captain James G. Allemann describes how a management tool is used to aid in full utilization of aircraft in the Third Marine Aircraft Wing.*
- How Officers Get Promoted ..... 15  
*A staff interview with the promotion boards of all three personnel offices of all three Services reveals some interesting facts about the criteria they really use to decide who is promoted and who is not.*
- Why the Speed-up in MAAG Training ..... 19  
*U.S. Military Assistance Program is becoming more and more important and increasingly complex. Here is a run-down on where MAP is headed.*
- Why Subcontractors Run into Trouble ..... 22  
*Third in a series on military-contractor relationships.*
- Why Navy Will be Ready for Tomorrow's War ..... 24  
*The Naval Electronic Warfare Simulator is Navy's way of providing warfare training in peacetime.*
- Diamond Ordnance Fuze Labs . . . Where "Butterfly Chasing" Pays Off ..... 33  
*A hands-off attitude by the Army has made DOFL, one of the smallest research labs, also one of the most scientifically lucrative.*
- What Repair Kits Mean to Air Force Maintenance ..... 35  
*How spending a little more has meant saving a great deal more in repair costs.*
- The Driverless Tug—A New Twist in Material Handling ..... 38
- Looking Ahead—The Challenge to Technical Publication Management ..... 40  
*Last in a series by Roswell Ward.*

## DEPARTMENTS

- |                                 |                                 |                                |
|---------------------------------|---------------------------------|--------------------------------|
| In My Opinion ..... 2           | Association Newsletter ..... 36 | Professional Services ..... 44 |
| Editorial ..... 5               | Dates To Circle ..... 38        | Research and Development .. 45 |
| Washington Background .... 6    | Your Investment Future ..... 39 | Advertisers' Index ..... 48    |
| Pentagon Profile ..... 27       | Personnel Preview ..... 42      | Rundown of Key Contracts .. 48 |
| Procurement and Logistics .. 29 | Shift in Key Personnel ..... 43 | New Products ..... 49          |

## FEATURED NEXT MONTH

Special theme issue on the evolution in military procurement; articles by Vice Admiral E. W. Clepton, chief of Navy material, Chief of the Air Materiel Command General E. W. Rawlings, and the Army's E. J. (Hoot) Gibson, chief of DCS/-

Log procurement division. Also, analysis of procurement operations at Army Quartermaster Corps, Navy Bureau of Supplies and Accounts, Oklahoma Air Materiel Area as well as listing of what military office buys what hardware.

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DECEMBER 1958

(Continued from page 2)

which potential users who are not abreast of the market may evaluate machines against their needs. Your recent systematic presentations of certain functional groups has been helpful in compiling current data.

This task, however is a continuing one. To derive maximum advantage from your excellent magazine we would like to know your policy and plans for the immediate future in regard to publishing a list of the latest business machines, together with suggested usage areas.

Richard McQuay

Management Analyst  
Hq, Second U.S. Army  
Fort George G. Meade, Md.

Next presentation of this kind will appear in AFM in mid-1959—Ed.

The several articles on electronic data processing appearing in the September issue are most interesting and informative; particularly to activities such as ours in the throes of planning for an EDP system.

LCDR K. W. Randolph  
Planning Superintendent, Supply Dept.  
Long Beach Naval Shipyard

We would like to obtain 25 copies of the September issue. We wish to use the excellent material on EDPS in orienting and training our Maintenance Engineering Systems personnel.

Francis J. Kelly  
Task Group Leader  
AMC Maintenance Engineering EDPE Program  
Hq, Air Materiel Command

I read with considerable interest the several fine articles on automatic data processing in the September issue.

However, I was quite disgusted to find that the information shown on pages 24 and 25 under the heading "Comparison of Major Computer Systems" is, in fact, more than a year old, although it is purportedly current information. This information is extremely inaccurate, incomplete, and misleading.

Raymond M. Ballard  
Data Processing Coordinator  
All American Engineering Company

Military information source (usually reliable) assured us the facts were current. Could be they were wrong?—Ed.

... This material will prove of use to our program here at the University.

G. R. Henrickson  
Asst. Prof. of Commerce  
The University of Toledo

... I am employed by the U.S. Army Ordnance Corps where I am presently involved in studying electronic data processing applications. I have had an opportunity to scan the September issue and consider it an excellent evaluation of electronic data processing.

Walter G. Stilwell

#### An error?

I was upset to see an error in your September issue in the comparison table of major computer systems.

Philco TRANSAC S-2000 is listed under small size computer systems. For your information, this computer is more than the equivalent of the IBM 709 and is larger in speed and capacity than the others listed in your large size computer systems column.

As you know, the TRANSAC S-2000 was the first completely transistorized computer, which reduced the physical size and power consumption. I am afraid that the individuals who compiled this list were misled by this fact. (Also) our airborne computer C-1100 ... should have been included among those listed under the section headed "Special Purpose."

Richard M. Fielding  
Government & Industrial Division  
Philco Corp.

Because speed and capacity designations are not standardized in the industry, we did indeed categorize systems by physical size and power consumption. C-1100 joins a list of many others which because of space limitations were not included—see footnote 10 on the table—Ed.

#### Standardization

I found the article (The Real Impact of Standardization, Sept. issue) to be most interesting, particularly with respect to its effectiveness in placing standardization in its proper perspective. All too often, progress in standardization is thought of only in terms of items reduced or in dollars saved. While both of these benefits are important, there are other tangible and intangible benefits which also significantly improve our military effectiveness. Secretary Higgins has covered these points well.

I am routing (this article) to members of my staff who are concerned with the implementation of the Department of Defense Standardization Program.

Paul H. Riley  
Director, Supply Management Policy  
Office/Asst. Sec. of Defense (S&L)

I know of Mr. Higgins' keen interest in the Defense Standardization Program, and his article (in September) is a fine tribute to the work being conducted in this area.

Glenn V. Gibson  
Director of Planning & Requirements Policy  
Office of the Assistant Secretary of Defense (S&L)

#### The B-52

We are intrigued by the picture story, "What to Do About the B-52," in the August issue. It is our thought that the rubber flotation bags used to lift the plane are of Goodyear make. Right?

J. P. Banks  
Goodyear Tire & Rubber Company

Move to the head of the class. Air Force Captain Eugene Guernsey at Westover AFB says you are correct—Ed.

#### Schure's Study

In your editorial in the September issue, you mentioned a study by Conrad Schure of the Navy Bureau of Ordnance on "Why can't we do both our scientific and our data processing on one type of computer?" I would appreciate it if you could tell me how I could obtain a copy of the study.

L. L. Palmer  
Technical Publication Section  
Sundstrand Turbo

Study, as far as we know, was reproduced for internal use only. However, you might be able to obtain one of the "extra" copies by writing Bureau of Ordnance, Department of the Navy, Washington 25, D.C. Attn: Capt. T. A. Brown, USN—Ed.

#### Impressed

We in the Office of Military Psychology and Leadership at the Military Academy were impressed by the well-written article, "Where Leaders Find Ideas," in the March, 1958, issue. The information contained in this article reinforces our idea that creative thinking by all concerned is vital during the Estimate of the Situation phase of planning.

Accordingly, (we plan) to reproduce this article annually in mimeograph form for distribution to West Point cadets during their senior year. I believe this article will supplement greatly the discussion of the function of planning during our management course.

Col. Charles G. Fredericks  
Director, Office of Military Psychology and Leadership  
United States Corps of Cadets  
West Point, New York

ARMED FORCES MANAGEMENT

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## EDITORIAL

# Biting the Octopus

**S**AID a veteran (civilian) Pentagon employee one day last week, "That's about what it's like, biting one tentacle of an octopus. There have been a lot of people, during the last 10 years or so, who would grapple with some part of this Defense organization. But no one seems to have nerve enough to go to work on the whole operation at once."

In performance, the latest Defense reorganization has not proven itself a "major" change—except in creating a vast uncertainty among the work force. The pieces of the puzzle are all still there, albeit possibly arranged a little differently.

The empires affected are growing larger, as they seem to do each time someone takes a new "bite,"—no matter what the implementing pieces of paper may say about "streamlining." (Examples: although military operations authority was transferred to the Joint Chiefs group, this has resulted in little decrease in the operations work force of the separate Services. They have, instead, begun to complain that there are now not enough officers to fill the two separate demands. The consolidation of Security Review operations in one office has increased the personnel there, cut the number of "bodies" formerly in similar separate Service operations hardly at all.)

Each reorganization, instead of sharpening the setup, seems to act like fertilizer, makes the plant blossom even larger than before. Where are the men who insist day after day that "we could do the same job in this shop more efficiently with half the people?"

Reorganization can not come from a piece of paper endorsed by a Congress and President. This only provides the authority. The change must come from the men in the organization. Because of the scarcity of men willing to make a decision, without someone else's endorsement, reorganizing the Pentagon is like trying to reorganize the United States.

In industry, if a man does not do a job, he is fired. They don't organize an office to find out why he didn't do what he was supposed to do in the first place. (One of the Pentagon's generals said recently, "The only way they'll ever really reorganize this place will be to fire 90% of the people, then shove the other 10% out the Mall entrance and tell them not to come back.")

In spite of comments that there would be big changes when the current Reorganization Act became law, a recent spot check of key staff offices shows that nearly four months later "things are still operating pretty much as they were." This was the most favorable, and most frequent, comment. The worst: "We couldn't get more fouled up if we tried."

It is the *people* who make an organization run, not the *organization* which runs the people. The vast network of informal contacts among Pentagon executives—the real key to efficient staff work, if no one tampers with it—has been crippled. (This capillary action is the reason most projects are well into operation before the first paper leaves the first office, already coordinated by a phone call, a trip across the hall, a conversation at lunch. This shouldn't be so surprising. The military talent for getting things done outside of channels is a battlefield legend.)

Reorganization of Research and Engineering is still a reorganization on paper only. If the change was so necessary, why hasn't it been made now that Defense has the authority? Decisions here will affect not only R&E but the Guided Missiles office, the Advanced Research Projects Agency, the Comptroller's shop, and a host of other internal and external agency relationships.

In practice, Defense reorganization has yet to produce any major improvements in operation; has, in fact, yet to prove itself even as efficient as the setup it is supposed to replace.

Bill Borklund





## Washington Background

**PENTAGON HAS TOLD INTERNATIONAL SECURITY AFFAIRS OFFICE THAT MILITARY ASSISTANCE PROGRAM** is going to have a "very rough time" at next session of Congress. Word has already "leaked" to various Defense people from Capitol Hill that some influential Congressmen are "going after the program harder than they ever have before."

**CONGRESSIONAL AXING OF MILITARY ASSISTANCE WOULD SABOTAGE DEFENSE LONG-RANGE PLANNING** as well. As Defense Secretary McElroy reiterated in mid-November, future plans call for build-up of allied forces to contain an enemy until we can arrive to help, back this up with ICBM Sunday punch from U.S. By-products; the land-based IRBM, no matter what its name, may shortly be a weapon of the past; number of U.S. bases overseas will drop.

**BUT REMEMBER, THIS IS LONG RANGE. IN THE MEANTIME, DEFENSE WOULD LIKE TO SEE MAP** spending increase, if anything.

**LONG-AWAITED CUT IN ARMY STRENGTH TO 870,000** has finally started. One Pentagon spokesman says when its completed this will probably mean the end of Operation Gyroscope (whereby Army rotated division units between U.S. and overseas). Target date: about six months. Army working on plan to replace Gyroscope with something similar for units of less-than-battle-group size.

**SPEAKING OF MANPOWER CUTS, RUMOR, NOT CONFIRMED** at presstime, is zipping through Army's Pentagon corridors that budget currently being prepared will call for another slice in Army strength—to 810,000. High-level decision on this will come in December, since force level is one of the last things decided before budget goes to White House.

**DEFENSE IS STEPPING UP THE TEMPO OF ITS WAR ON HIGHWAY ACCIDENTS**, which are causing serious manhour losses at U.S. military installations. (Nearly 35,000 members of the Armed Forces were involved in accidents, two-thirds of them while in military vehicles, during fiscal '58.) Pentagon has started a one-year test at Lackland AFB, Tex., to see if there's any truth in theory most accidents are caused by deep-seated emotional disturbances. Net result will probably be accident-prone Servicemen will face psychiatric treatment or military discharge.

**NAVY IS STUDYING POSSIBILITY OF MAJOR REORGANIZATION**, particularly in its research and development effort. Committee, headed by Under Secretary William B. Franke, is reported analyzing possibility of new organization along functional lines, breaking up parts of the Bureau system. Legal problems, entrenched operations, however, make chances of such a move jelling quickly little better than "slight."

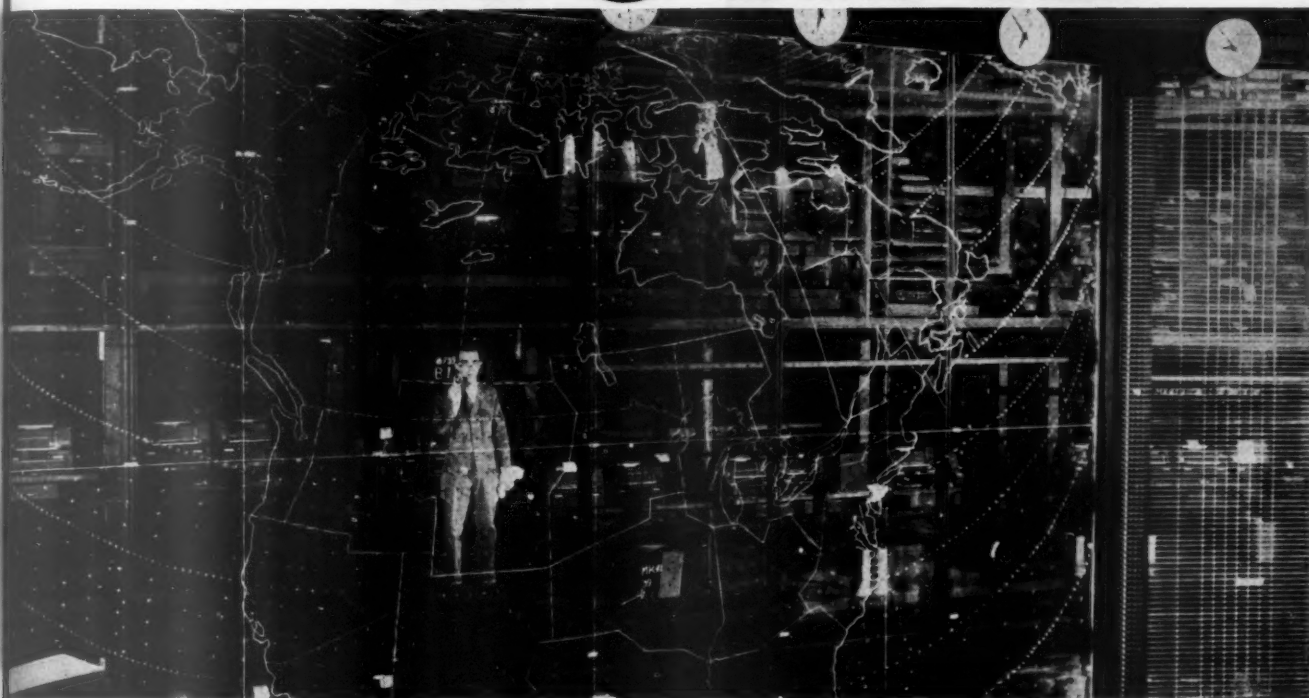
**MASSIVE RETALIATION ARGUMENTS RECEIVED A BOOST RECENTLY WHEN ARMY REVEALED** some medical tests indicate radiological effects do not take place until some two days to two weeks after exposure, means soldier could still fire weapons even though he might be dead a few days later, to some extent lessens value of long-range surprise attack.

**WEAPON SYSTEM MANAGEMENT CONCEPT MAY HAVE WON A REPRIEVE** from House Armed Services Subcommittee investigation—at least until next year. Testimony was to have started in December on "high costs of weapons" developed under concept and "team" approach of sharing weapon development. Subcommittee agenda reportedly calls for investigation of asphalt vs. concrete for airstrip pavements controversy first; follow that with check into alleged tardiness of Armed Services Board of Contract Appeals in processing claims. Other items on the list: procurement regulations, utilization of government-owned facilities. If Weapon System inquiry does start in December, military secretaries will lead off testimony.



**Wrap-around  
bumper for  
a continent**

# NORAD



*Headquarters—NORAD—Colorado Springs*

Like a huge "bumper" wrapped around the North American continent and reaching down along both the Atlantic and Pacific shores, the North American Air Defense Command (NORAD) has been created for operational control of air defense units of the Army, Navy and Air Force of the U.S. and the RCAF Air Defense Command of Canada. Its field includes the vast area between the southern border of the United States and the

northernmost limits of Canada and Alaska. Under the functional control of NORAD will be BMEWS (Ballistic Missile Early Warning System) and SAGE (Semi-Automatic Ground Control Environment) for the defense of specified sectors. In addition to its responsibility as prime contractor for BMEWS, the Radio Corporation of America is working on other important electronic assignments for NORAD.



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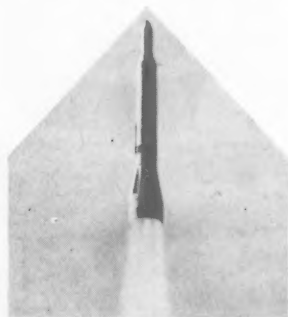
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DEFENSE ELECTRONIC PRODUCTS

CAMDEN, N. J.

DECEMBER 1958

# Why Polaris is Winning Its Race Against Time



*A major reason for the Polaris project's success in beating deadlines (according to the men in the Special Projects office), has been a top-notch management control of the program.*

by Bill Borklund

**E**ACH Monday morning at 8:15 from 75 to 80 people file into a Management Center\* in the Navy's Special Projects Office in Washington, D.C. Their job: develop an operational Fleet Ballistic Missile by 1960. The group consists of top management staff from the SP office, representatives of government agencies working for SP, and FBM contractors.

They spend the morning (less a 15-minute coffee break at 10:00) par-

ticipating in a two-part session which includes:

1—Discussion in specifics by a key speaker, with direct concern for some portion of the program, of his problems and progress.

2—A run-down of progress highlights for the previous week. An 8-minute clock is held on branch chiefs who must report, in that time, (a) what happened in the past week against detailed plans; (b) the significance of any change from plan; and (c) the action proposed to adjust to these reported effects, if any. For each major work area they report the weekly status as being in Good Shape,

Minor Weakness, Major Weakness or Critical.\*

Reason for the 8-minute clock, said one SP official, is because "The easiest way for a person to avoid telling his supervisor how he is doing is by writing him a 200-page report. We use simple terms in which responsible people deal with one another."

Immediate objective of the group conference: correlate and integrate branch efforts, keep them pointed toward the ultimate FBM goal. Long range objective: maintain an effective and efficient control over that portion of the Nation's limited resources (of which the most limited is time) which back this multi-million-dollar project.

Few people realize how quickly the problems of the Space Age have moved from the laboratories and the equation-covered blackboards to the executive and legislative offices of Government. Even fewer realize that, to a large extent, how well we succeed in this defense effort will be a direct result of how well it is managed.

Said Gordon O. Pehrson of the Special Projects Office, "I remember when Buck Rogers and I spent part of Sunday morning on the living room floor. We had a clear understanding that this sort of thing was not supposed to happen until the next century. Yet today, the theme—management in the Space Age—is a proper and completely meaningful framework within which to hold thoughtful and wide-ranging discussion on the opportunities and the necessities for re-examining the Defense Management System."

It is in the management of large programs that we meet directly the sharp edge of the Soviet challenge—their system versus ours. Russia's Nikita Khrushchev boasted recently: "Our System has permitted us not only to beat the United States, but to surpass it in science and technology." In its final analysis, the contest is as fundamental as that.

The Fleet Ballistic Missile Program is a search for a new military capability—the capability to launch long range ballistic missiles with TN warheads from submerged nuclear-powered submarines. But the program is more than just hardware. Of equal im-

\*In the language of FBM progress, "Good Shape" means "everything I proposed to happen last week that I thought would represent progress did happen—I am happy with the way things are going;" "Minor Weakness" says "something happened that I didn't want to happen but I can handle it without help"; "Major Weakness" is the same as Minor Weakness, except "Boss, I need your help"; and "Critical" means "Boss, you need help."

ARMED FORCES MANAGEMENT

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portance, as in all major weapon system programs, are the men and the operating and logistic support required to bring men and hardware together.

Major attention in SP has been devoted to the human engineering aspects of the FBM program—the selection, training, and motivation of the men who must use and maintain this weapon system. The FBM program is a complete package. The program has been defined and re-defined in these total terms with each new weekly session in the Management Center.

How much the SP office is doing in the management field that is really new is debatable. Certainly, bringing each new contractor to SP headquarters and briefing him on where he fits in the system and how it works is not a startlingly new idea. One of the chief assets, however, has been an ability, through their management operations to re-discover some management techniques which were overlooked before.

In boiled down terms, there are probably three key reasons for the startling success of the FBM program's management effort—and thereby the direct success of the program, itself:

1—Clearly defined objectives (definitely not a new management idea, either).

2—An early recognition that good management control (communication, coordination, evaluation) was of top importance.

3—Because of the time element, the Defense planners who set up this project manager-type of office noted early in the game that they would have to design a system which could end-run the one big organizational problem still not solved, as a general rule, in Defense operation. The problem: there is rarely an opportunity for military departments to show the interrelationships of a total project effort. There are too many divisive influences which tear programs apart. (R&D, Supply, Procurement, Budget and others all too frequently take their segment of the program off into a corner, don't bring it back until deadline time. Net result: rarely are breakthroughs in one area fully utilized in others; it is difficult to keep track of the total goal; minor problems receive too much emphasis while major ones are ignored—something like swatting flies with a sledgehammer.)

To quote Gordon Pehrson again: "The concept of the Special Projects Office as a small Management Team operating under special charter in the basic organizational structure of the Navy is unique—I know of no counterpart."

"It is a sophisticated concept, based on three things:

1

"That the act of coordination is an act of authority and not merely a proposal to cooperate. The Director/-Special Projects has the authority to require coordinate action.

2

"That the present organizational resources of the Navy, properly used, represent one of the strongest assets this country has for carrying out the program. Recognizing this, the SP director's authority has been substituted for that which follows from complete command control of all Navy resources involved in work on this job. The response of all parts of the Navy to the identified needs of this program has been magnificent.

3

"Finally, the concept of the Special Projects Office recognizes that there will be hundreds of decisions made which must be both quick and wise. The array of alternative courses of action offered by scientists and engineers is far greater today than at any previous period in history. This is indeed probably the most striking problem with which management has to deal in the 'Space Age.' It is a problem of wealth just as the traffic problem is a problem of wealth—too many automobiles.

"The Director has been given not only the responsibility for being right in reaching final objectives; but, to put it very bluntly, he has been given the authority to be wrong in some of the many decisions that have to be made. To date SP has not been seri-

ously handicapped by the activity of the many—call them special 'Protective Staff Groups'—who, in seeking to prevent minor error by laborious, indecisive and vaguely conceived review procedures, delay and sometimes deny major success."

The Special Projects office is a small top management team, a key organizational part of the FBM Management story. But SP has other advantages. Among them:

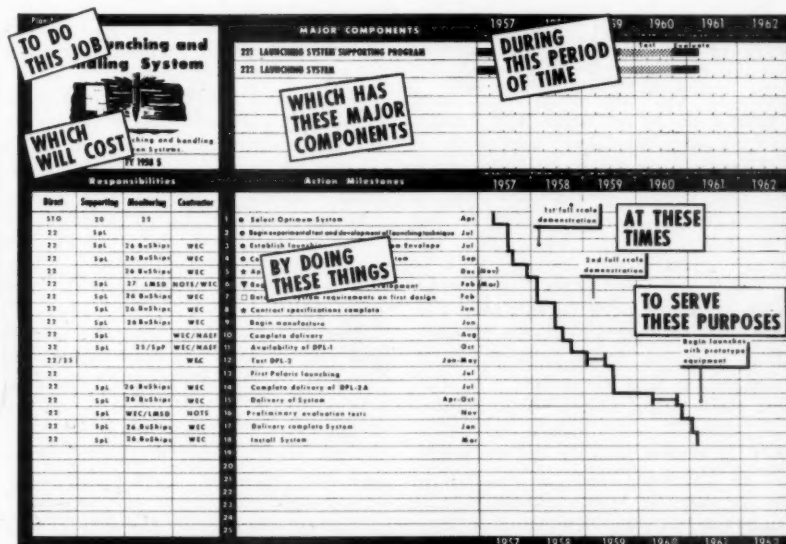
1—Its mission has the highest of high priorities;

2—The small staff was hand-picked from the start, given extra financial recognition for the superior talent they brought to the FBM Program;

3—There has been a certain amount of unplanned luck (but they have been able to take advantage of it faster and more thoroughly than a more conventional organization could);

4—Congress wants to believe it will work (So Defense does not have the usual problem of convincing them when SP needs money).

SP has one other big advantage which the Program's employees rarely fail to mention. He is SP Director, Rear Adm. William Francis Raborn, Jr. Probably as salty as any other sailor in the Navy, he is also one of her best staff men. He has carried a reputation as a solid Navy officer since his graduation from Annapolis in 1928 but was little-known outside sea-going circles until 1954—when an explosion rocked the forward section of his ship, the USS Bennington, during air operations off Newport, R.I., killing or injuring 220 men. The story made national headlines. His "outstanding leadership, courage and inspiring efforts" in handling the disaster earned



Each week, Special Projects and the development teams run a check on how well they are doing or not doing against planned time programs, put heat on the trouble spots.



him a Bronze star.

Said one SP staff man: "He has a fascinating combination of talents. And on top of everything else he is a terrific salesman."

When Raborn was given the FBM Project in December, 1955, he knew only two things: where he was and where he had to be. His job: figure out how to get there. He has become identified with the management of the program as much as with the technical aspects; has created a government management example for industry to follow (for a change). Concerned with more than just general policy, he also carries tremendous authority to make specific decisions.

Through the weekly use of the management center, he and his staff receive a thorough rundown on progress, problems and outlook; stay

Anaheim, Calif., the instrumentation; and the AEC Livermore, Calif., plant the warhead.)

The program time schedule was dictated by appraisals of our National exposure, assessment of the Soviet capability and calculation of our own ability to create this type of a weapon system. Within this framework, in the SP office there is a continuous cycle, or a feed-around of decisions, response to decisions, evaluation of response, re-examination of basic purpose, and initiation of new proposals for decision.

The new dynamics of technology provide a flood of inputs to this cycle—inputs that must be accurately identified, and assayed for their value to the program in an orderly, logical way. With no method for doing this, the executive would become—either a helpless observer to what is happening

technical proposals which recurrently feed into the inner circle of the Management Cycle represent answers to six basic questions—What is it, How does it "fit" into the design decisions made, What performance is required, What "value" does this performance have to the system of which it is a part, What is the technical approach proposed, How will you find out what the performance is?

In the outer cycle (see chart), the problem was to design a Program Planning and Control System that would permit a small staff to do the job.

SP established six simply-stated objectives in the design of the Program Planning and Control System:

## The Six Objectives

1—To organize facts for complete decisions.

There are many parts to this. One of the parts is a summary form which is obviously nothing more than a simple procedural tool. Yet for lack of attention to these seemingly small details large programs have floundered.

This form requires that all proposals be prepared in context with the total range of related supporting and supported actions. In other words, "What is one man's means becomes another man's purpose." This is a basic recognition of the fact that each level of responsibility should have the authority to determine the means by which it achieves assigned objectives.

It is a simple reflection of the belief that if each level of authority in a total organization provides clear and accurate answers to the What, Why and When questions to the next lower level of authority, it is far less necessary to prescribe How the job will be done at that next lower level.

2—Communicate the context of complete decisions.

The effect of these changes on other areas of work in this complex inter-related system development effort had to be detected and then made known to many, many persons involved in the work. There had to be a quick, inexpensive way of reporting these changes to everybody involved in the program and describing them in context with the total job to be done.

The "Program Management Plans" are doing the job and for less than a penny a copy. These plans are reproduced and distributed to all persons identified on the form as having any responsibility for the Action Milestones listed.

3—To organize facts for supporting staff actions.

"In our system," said one staff man, "our total plans for 'getting facilities'

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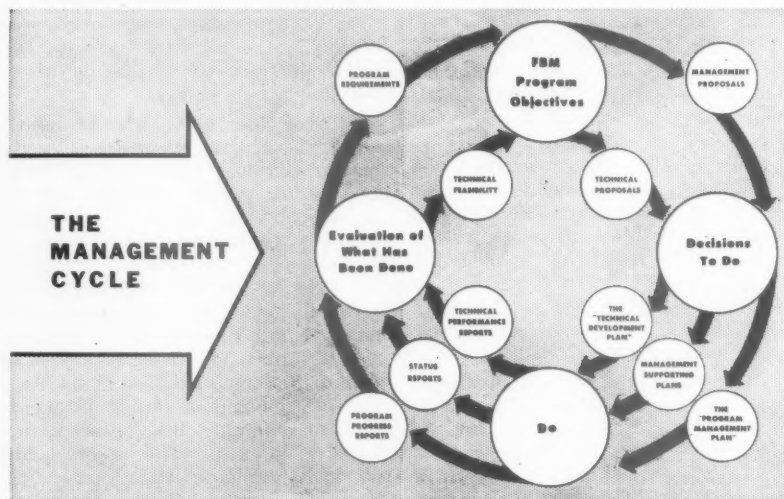


Diagram shows how program managers coordinate all independent actions and information.

constantly abreast of the situation. The mark of his success is the constant parade through his large, carpeted office of top contractors who have "come down to see what 'Red' Raborn and his team are doing," ask advice.

Largely through his efforts in guiding this unique management system, morale at SP is high. There are no anonymous people. Each can see where he fits in the picture.

There are over 2,000 contractors with important work on this total job. The Armed Services-Industry team effort stretches from coast to coast. (The final Polaris test facility is at Patrick AFB, Fla.; Lockheed in Sunnyvale, Calif. is prime missile contractor; MIT in Boston handles the guidance; GE in Pittsfield, Mass., is responsible for fire control; Westinghouse, also in Sunnyvale, has the launching & handling; Aerojet-General in Sacramento the propulsion; North American in Los Angeles the navigation; Interstate in

or a blind adherent to a rigid pattern of pre-determined actions—inflexible long range development plans.

Somewhere between confused indecision and inflexible dogmatic dictate, the management of the program set its course. SP started early with a technical forecast. A steering task group, working together for a solid three months, developed the forecast for each major weapon subsystem within the time frames established by the program mission.

Based on the best scientific advice and trends, forecasts were made, for example, of the efficiency of the propulsion system at a future date; on the weight, size and other requirements of the guidance system, the re-entry body and the warhead. These and many others were included in this forecast.

This was essentially the first "Technical Proposal." When approved, it became the first chapter in the FBM Technical Development Plan. The



(for example) 'fall out' of the individual proposals which require use of facilities. Our Facilities Officer picks up his job of obtaining facilities after their need has been approved as a program requirement. His total job, of providing facilities, is in turn developed and presented on program management plans in the same manner as all other effort. These become his Job Orders—directly related to the total defined and integrated effort of the Program."

4—Establish the terms of accountability for performance of approved work.

The Problem: insuring that the "Doer" clearly understands the terms in which he is to be held accountable by the persons who said "Do."

The principal point to be made in relation to the SP system is that these terms are specific. The results are spelled out in terms of objectives (ends to be obtained) and action milestones (means to be followed). And all of these specific results are defined in a framework of Time. The staff members are held accountable for the program management plans which they have proposed, had approved by varying levels of authority and received back as assignments and authorizations. In other words, "You said you could do it. Now," says Raborn, "prove you knew what you were talking about."

5—To provide the basis for a "need to know" progress reporting system.

What we call "need-to-know" reporting reflects a staff discipline too rarely applied. (It is easy for staff to use the authority of the position they serve to request information through reports. It is a good deal harder usually for the staff to clearly define why they need to know—i.e., establish a need-to-know in the specific terms of needing to act on the data.)

Each "action milestone" selected represents a "need-to-know" fact of performance. When these program management plans are carried down to the level of the contractor, he and the SP staff pre-select the "need-to-know" facts. These become the basis of the reporting system.

By direct code reference to plans and action milestones, SP receives weekly, bi-weekly, or monthly reports based on the specific scheduled data selected for reporting. Contractors have sighed with relief at this simple, direct and most meaningful way in which to report their work under their contracts.

6—The final objective was to provide the framework for responsible and objective evaluation of progress.

The first and perhaps most startling fact is that SP assumed the men responsible for performance also had first level responsibility for assessing their

progress. Simply stated, that the men were honest. (You will find no special group in SP whose job it is to prove that others are lying about progress in their work areas.)

In the weekly staff meetings, the Branch Chief puts each of his problems and accomplishments in context with the program by use of the Plans involved. These are shown as view-graphs from the negatives used in printing the Plans. On these charts there is a simple progress code used to check off the action milestones:

a. A dot to indicate a job done as planned.

b. A star to show work done ahead of schedule.

c. A triangle to show failure to do a job on time.

more of the same thing) SP applies Line-of-Balance techniques.

The Line-of-Balance management report has been introduced into almost all major contractors' management staff work. Successfully used, it is a means of tying prime missile contractors' work together with his principal subcontractors, has been carried as far down as third tier subcontractors. Says SP, "Without exception, these contractors have adopted this management tool with enthusiasm as an excellent means of staying on top of their management problems." It is a means of accurately assessing the status of "in process" work in terms of ability to produce end items on contract schedule. The charts that show this status reveal not only progress, but identify

REPORT OF PROGRESS AGAINST PROGRAM REQUIREMENTS  
MATERIALS-1155 (REV. 1-58)

CLASSIFICATION (When Filled In)

REPORT CATEGORY

CONTRACT NO.

REPORT PERIOD (From To)

TO: \_\_\_\_\_

FROM: Sp-12 \_\_\_\_\_

From: Sp \_\_\_\_\_

(CONFIDENTIAL when filled in)

Form A (5050-1)

MILESTONE SIGNALS AND CHANGES TO MANAGEMENT CENTER CHARTS FOR WEEK ENDING \_\_\_\_\_

Chart #	Milestone #	Signals	Change or reschedule date to:	Remarks - (include reason for signal, other than green, and rescheduled dates)
		G O R B		
		● □ ★ ▼		

Shown above are tear sheets from two of the key charts which measure progress against requirements.

d. A square to show concern over ability to meet a future date.

These symbols are used in color on the top level long and short range charts on permanent display in the Management Center.

The second part of the evaluation system is tied to Line-of-Balance\* analysis. As soon as any part of the program moves out of a development phase (i.e., they begin to make two or

\*Line-of-Balance technique is nothing more complicated than determining lead times required for components of a total system, making sure their preparation is started early enough so they will be ready for the production line when the weapon system being built is ready to receive them. A miscalculation can mean missed production schedules, additional cost in idle time, unnecessary storage, maintenance, etc.

the production processes themselves in considerable detail.

How well is the SP operation working? Well enough that Polaris, for instance, is in some phases nearly two years ahead of schedule. Well enough that Bureau of Ordnance which supports SP administratively is now adopting many SP methods of operation. Well enough that BuShips has adopted the structure lock, stock, and barrel including establishment of the actual physical management center—uses it constantly, sending its reports clear to the top of the BuShips organization.

Defense department gave SP the advantages it has because Defense set up the SP Office. What aggravates many critics of the Defense R&D setup: not enough people with influence seem to realize that without any Defense organizational change many of the top R&D projects could be handled using this same approach.



The P6M cruises at 600-mph speeds, requires no more water for landing and take-off than do conventional aircraft.

## Sealift: A New Concept in Logistics

*With few world tension spots more than 50 miles from a body of water large enough to handle seaplanes, these aircraft take on new significance in world politics. Top military personalities have given semi-official backing to the possibilities of the idea.*



Sleek SeaMaster lines belie large cargo capacities. 30,000 lbs. of weapons, nuclear or conventional can be fitted easily into the plane.

**T**HE Navy's six Martin P6M SeaMaster jet seaplanes now flying at Baltimore are attracting new attention to the seaplane as a modern vehicle for versatile assault missions, and beyond that as an attractive vehicle for rapid long-distance troop transport and logistic supply.

Operating daily from The Martin Company's Baltimore seadrome, the six P6M's are a squadron prototype of the nation's first seaplane striking force. Navy officials envision a wide dispersment of small units of these planes in areas where it is impractical to keep larger carrier forces in readiness to return an enemy's sneak attack. The planes will be able to live on the water for long periods of time and maintain complete freedom from the international political complications, or target vulnerability inherent in the exclusive use of foreign bases.

The P6M's operating capabilities—600 mile-per-hour speeds, and the profile and performance characteristics of any equivalent land-based bomber—have not gone unnoticed in the Navy's sister services. For example:

1. Maj. Gen. Earle G. Wheeler, the Army's assistant deputy chief of staff for military operations, told Congress last April 14 that "the strategic and logistic potential of large water-based aircraft is most promising and should be explored." He said the Army has been conducting studies at "the staff and war game level" looking to the utility of seaplanes for various missions.

2. Gen. Thomas D. White, at the time vice chief of staff of the Air Force, declared in a speech on October 8, 1955, just three months after the P6M prototype's first flight: "It is conceivable that a nuclear powered, water-based aircraft may become an effective bomber, suitable for the Air Force's wartime strategic bombing mission. Formerly, of course, water-based aircraft had neither the performance nor the capability to be used as Air Force bombers. However, new engine developments may enable the water based bomber to take its place alongside other Air Force airplanes and missiles."

3. Maj. Gen. H. R. Paige, assistant chief of staff for logistics for the Marine Corps, also told Congress on April 14: "I believe the sea-based transport aircraft has certain limited possibilities and certain limited use. It would be good for use in landing specific reconnaissance parties in certain areas and recovering them. It would be useful for the transport of emergency supplies and various other types of logistic support in that field."

Today, while Congress and the military debate the issues and weapons requirements needed for limited versus all-out nuclear warfare, the P6M emerges as an airplane unique in design among all modern jet-age aircraft. It can carry a larger payload (30,000 pounds) of conventional or nuclear weapons than any of its land based competitor aircraft, or can sow mines in enemy harbors to throttle submarines and shipping in a manner proven extremely effective against Japan in the latter stages of World War II. As an attack aircraft, it is capable of top-speed, low-level

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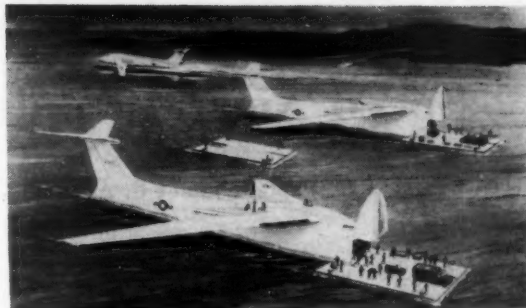
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On land and in the water, the P6M offers an excellent potential for logistic support. While it is not fully amphibious, the big seaplane can taxi into land-type gear and move out of the water under its own power. Land gear is dropped before the plane takes off.



penetration of enemy territory below the screens of hostile radar. As a seaplane, it can utilize elusive water runways and submarine tankers met in secret rendezvous to extend its range of penetration into an enemy's hinterland. The P6M can also be utilized for toss bombing, or to carry one of the currently planned Intermediate Range Ballistic Missiles.

Production P6Ms are now under construction at Baltimore, and the Navy is modernizing its seadrome at the Naval Air Test Center, Patuxent River, Md., to be ready for board-of-inspection survey trials with the present six aircraft next spring. In addition, construction has begun on a \$20,000,000 east coast seadrome at the Naval Air Station, Harvey Point, N.C., to serve as the first permanent home for P6M squadrons upon completion of the facility in 1960.

Looking beyond the P6M, Martin is now proposing a seaplane of even larger size with 8 to 10 jet engines, and in the 200-ton to 300-ton gross weight category to answer the need for long range strategic airlift. Now on the drawing boards, the aircraft is known as the SeaMistress. It would be capable of carrying over 400 passengers, or 3 light tanks, or an entire infantry company fully equipped, together with its supporting vehicles and three days of supplies. The ideal aircraft for airlift purposes, according to the June, 1958, issue of the official Department of the Army publication, *Army Information Digest*, would be one capable of carrying 600 or 700 troops at speeds of 500 to 600 miles per hour, or heavy combat equipment, non-stop, for distances of 3,000 to 4,000 miles. The *Digest* also suggests that seaplanes "might very well be the answer to strategic mobility for Army forces."

Gen. Nathan Twining, chairman of the Joint Chiefs of Staff, in an address to the Association of the U.S. Army last October 21, said: "I would like to see more and better airlift as has been advocated by the Army and others . . . But, when I sit down with the Joint Chiefs of Staff and look at all the requirements which are more important today, we have no alternative but to accord airlift and . . . other items lower degrees of priority." Nevertheless, the Air Force, which has budget responsibility for airlift, appears to be contemplating eventual development of a large jet transport. Last March 13, Lieut. Gen. C. S. Irvine, USAF deputy chief of staff, materiel, told Congress: "We do not think at this time it makes sense to go to a jet-powered (transport) version. Inevitably at some point we will have to do it."

Detailed surveys of the contested areas of the world, Martin engineers point out, reveal that there are few areas more than 50 miles from a body of water suitable for large seaplane transport operations. In most countries, the number of useable water bodies outnumber the number of land runways by factors of between 15 and 20 to 1. Many of the austere unloading techniques tested by the Army with surface vessels are useable with large seaplanes. This

would permit the unloading of heavy, bulky cargoes in the complete absence of large cranes, prepared docks, or elaborate exitways. In addition, the use of airtransportable lightering and cargo pallet flotation equipment would rival any such facilities at forward area land based aircraft terminals.

One of the most important contentions which Martin makes is that the emphasis in military planning should turn more towards satisfying the needs of combat forces for their special fighting tools, rather than compromise the tools so that they can be made to fit into the limited space of today's transport aircraft. In a statement before Congress last July 24, Gen. Twining admitted that, while an Army division can presently be airlifted overseas with present transport planes, "they can't move the heavy equipment by air." Gen. Wheeler, in his statement to Congress April 14, echoed these remarks when he told the Congressmen: "We have sacrificed to a degree some of the combat capability by lightening our equipment" in order to make it air transportable.

Another important advantage which the fast seaplane transport would enjoy is an ability to utilize present-day ocean going tankers to refuel on trans-Atlantic hops. These tanker ships regularly travel over Atlantic and Mediterranean routes where weather and sea state conditions would permit seaplane landings and take-offs for en route refueling purposes. The equipment required for such a fuel-transfer operation was developed and tested twenty years ago. Another alternative would be to refuel en route in secret rendezvous with a submarine tanker—a technique which has been successfully tested by the Navy in connection with development of the P6M weapons system.

Martin engineers also point out that a new development in water based aircraft design makes possible the replacement of the rigid metal hull with a non-rigid impact-absorption hull. The new hull would permit landings on improvised snow and ice runways with the same "g" loadings in the cabin as are sustained in normal oleo-shock-absorption landing, and without the weight limitations of ski or wheel-carrying aircraft. This development can be considered of major significance in the light of Air Force statements that it contemplates construction of missile-firing sites in the Arctic wastes. One of the problems facing this undertaking, however, is the present limit in size (i.e. payload) of land based aircraft that can be ski-landed on improvised Arctic runways.

In the last two years increasing criticism of the inadequacy of the U.S. airlift capability has been voiced by Senators, Congressmen, the Rockefeller Brothers Fund, and even some military leaders. Sen. Stuart Symington, the Senate's leading advocate for greater airlift, made this historic statement last July 24: "We may have a chance to prove who has been right about this airlift requirement, but that is a sorry way to prove it, if we are wrong."



# How Graphic Displays Speed Aircraft Maintenance

by Captain James G. Allemann, USMC

USING modern graphic display techniques in aircraft maintenance, a comparatively new medium for the military, has provided a vastly improved record system.

Few major problems in maintenance procedures cropped up during World War II and in early post war aircraft because maintenance was simple. However, since the advent of complex modern aircraft, our World War II procedures have proven themselves inadequate. Periodic inspections, required after each 60 hours of flight, were creating work load peaks and valleys. To complicate the problem more, one flight hour now represents the expenditure of six to seven times more maintenance man hours than required 10 years ago.

To satisfy aircraft maintenance requirements and still achieve maximum utilization of manpower, our current aircraft maintenance system was critically reviewed. Most promising area to hit first was the "Periodic Inspection" since it makes up approximately 33% of the squadron-level maintenance work load and is a stable requirement.

Result of the review was a new inspection system now being used by the 3d Marine Aircraft Wing. Titled Planned Progressive Maintenance, PPM is designed to eliminate the work load peaks and valleys by handling these requirements in smaller, daily, planned increments of work. This system is predicated on utilizing a minimum of 50% of assigned aircraft for daily flight scheduling, while the remaining aircraft are undergoing re-work, repair, scheduled (PPM) or unscheduled maintenance.

Through projected and coordinated planning by the operation and maintenance sections, this system becomes as flexible as training requirements and commitments dictate. The basic PPM system was implemented by dividing the aircraft into specific inspection/work areas or sections, i. e., wing, right fuselage, empennage. Secondly, the inspection requirements handbook was apportioned and placed on cards covering inspection/work area requirements for a four-hour flight period.

Utilizing this method of inspection at four-hour increments, it is possible to accomplish the majority of inspection requirements during turn around

time between sorties. By careful flight scheduling it is also possible to plan for the timely completion of the remaining inspection in such a manner so as to avoid heavy man hour requirements at any one time.

To aid in monitoring the cycle progress of PPM each squadron was implemented with a graphic display board. Through standardized graphic plotting it denotes time in PPM cycle, status of aircraft, progress of flight utilization and PPM card issue and completions.

To monitor the daily progress of the reorganized maintenance system a reporting procedure, by squadron, on each individual aircraft was required. Through comprehensive study, squadron reporting requirements for such a system were determined. The report, a "Daily Aircraft Status Work Sheet," is based on actual aircraft inventory hours lost to or utilized by Aircraft Out of Commission for Parts (AOCP), awaiting parts, maintenance and flight over a twenty four-hour period. Information received from the report is processed for ready analysis by transforming the submitted inventory hours

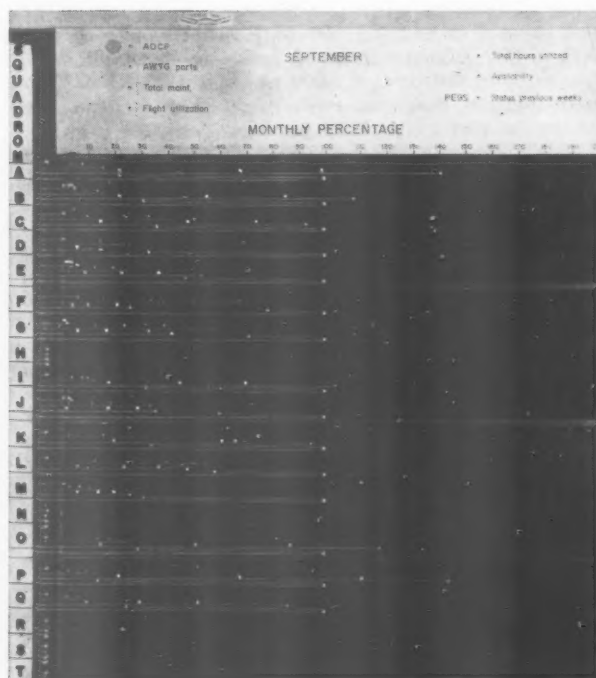
into percentages and graphically plotting them on a large type graphic display board.

The board is vertically divided for plotting weekly and monthly percentages simultaneously. This board is kept current daily for depicting the weekly percentages, and weekly for denoting the monthly percentages.

The AOCP, awaiting parts, and maintenance pegs denote that percentage of the squadron's available weekly and monthly aircraft inventory hours that were lost or utilized. The flight utilization indicated represents an attained percentage of a week's utilization by days reported and monthly utilization by weeks reported. At the end of each month the complete board is replotted, utilizing monthly time factors, and photographed in color for permanent records.

Standard maintenance percent requirements, by type aircraft, in ratio and proportion to flight utilization and material condition of aircraft are obtained by analysis of previous monthly reports. By comparing these percentage figures to the graphic progress of each squadron, trouble areas are often predetermined.

The use of graphic displays for plotting applicable maintenance factors has proven invaluable in determining the progress and values of our reorganized maintenance system. In addition it has made available to the Commanding General and his staff a current, picture-type, ready reference of progress on each assigned squadron.



Typical graphic display shows many facts in capsule form. Instant legibility is a major advantage of these displays.

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# How Officers Get Promoted

*Navy's Bureau of Personnel has a form letter for irate Congressmen whose constituents have been passed over for officer promotion: "Promotion is not a reward for long and faithful service," it reads in part. This statement applies across the board, to all officers who would be promoted in the future. . .*

by Fred Hamlin

"I THINK you can lay every trouble the Navy has today on the doorstep of its personnel policies—if there are any policies."

"It's past time for me to get out of the Army—I'm fed up with making million dollar decisions at a dime a shot."

"The best way to get ahead in the Air Force is to keep both feet firmly on the ground. The boys that fly don't have time to play politics."

The above comments were made by field grade officers—men who have spent over twenty years serving in their respective services. They are representative of many officers in their three services, of all ranks. Their complaint is standard—the promotion system.

These complaints stem from several factors. First, in any system which is aimed at satisfying a majority, there is bound to be a minority which gets hurt. Second, in many cases the service promotion systems are greatly misunderstood, both by officers in the particular service, and those in other services. Finally, there is considerable misunderstanding of the promotion system's purpose—why it exists in its present form, and what its aims are.

It is in this last case, perhaps more than anywhere else that the existing bitterness towards military promotions arises. Summed up by a Navy captain in Bureau of Personnel, the trouble is this: "Every ensign that comes in the Navy, if he is sensible, will realize that he faces attrition at every step in his military career. Unfortunately,

many consider promotion to be an automatic process. They only let themselves in for a rude awakening."

Admiral Arleigh Burke, Chief of Naval Operations, was on the same track in speaking to a group of Rear Admiral selectees this year. Said Burke, "You have been selected to the highest permanent rank in the Navy, not on your past performance alone. Your past performance had, of course, a great deal to do with it, but you were selected on the basis of what you can do for the Navy in the future. There is no other basis for selecting a man to flag rank. Flag rank is not a reward for past performance . . . You were selected because you have stamina, the guts, the enthusiasm, the drive, the intelligence, the judgment and all of the other factors which go into making a good flag officer. In other words, the Navy expects to get a lot of work out of you, and I am pretty sure it will."

## Word to the Wise

In spite of these words being directed to Navy flag officers, they apply specifically to every officer in any service that has ever received a promotion—and they serve well as a word to the wise, among those officers who expect to come up for promotion in the future.

The point is this. The promotion systems, in each of the services, are not now, and have never been geared to the individual officer. If that officer benefits from the system, it is strictly

secondary. The prime purpose of promotions is to give the services the very best leadership possible. Career incentive is without question a part of this, but it is no more than that. As one Army officer points out, "What we need in the Army, and what the individual deserves are two entirely different problems. This situation brings up a very difficult psychological point. The man who isn't promoted immediately looks at it from a personal point of view and asks 'What's the matter with me?' There may be absolutely nothing wrong with him. It could simply be a matter of being at the wrong place at the wrong time. Morale is a consideration, but what scheme do you use? Our job is to provide leaders of the highest possible caliber."

With this basic premise in mind, it is worthwhile to compare the promotion systems in the three services. Because all three services run their promotions under Congressional law, there is a necessarily basic similarity in how they are handled. On the other hand, there are many differences in the systems, dictated by the different service missions.

The Navy, for example, is built around ships, and all Navy operations can be traced back to that first source. Because of this, and because sea operations are about the same in either the Atlantic or the Pacific, it is possible for the Navy to run a promotion system which is more centralized—and perhaps a bit simpler—than that of the other services.

On the other hand, Army, with its seventeen branches, and its great diversity of operating stations—from Iceland to the tropics—is much more prone to specialization. They must think carefully, before promoting a man who will be assigned to a job or an area where he might not be as well qualified for higher rank as he is in his present assignment.

On this scale, the Air Force falls about in the middle, because it must operate with some of both ends of the scale. Its pilots can operate in essentially the same way regardless of conditions, but the tremendous support staff of the Air Force is subject to the same limitations as the Army.

One effect of this is on the present "hump" situations in Army and Navy. During World War II, Navy used block promotions—entire date-of-rank groups were considered and promoted. As a result, their present rank pyramid is top-heavy, and Navy needs legislation badly to solve their promotion problems.

On the other hand, Army handled most of its World War II temporary promotions by areas. These spot promotions served to smooth the overall promotion setup in the Army, and the Army's present situation is considerably more promising than that of Navy.

## Basic Consideration

Probably the most basic consideration in an officer's promotion potential are his efficiency reports. While they are only a part of the total record which promotion boards consider, personnel officers in each service are quick to say that the efficiency reports are considered first and foremost in reviewing officers for promotion. All three services have published detailed instructions for filling out these forms, and the most common complaint of promotion boards is that the reports are not filled out adequately—that they do not give a representative picture of the officer in question.

Although one Navy Captain justly points out that all parts of the efficiency reports are essential (when asked which part was most important, he replied "Which of the horse's four legs is most important?"), it appears to be the consensus that the written word picture of the officer is perhaps a bit more heavily weighted by selection boards.

The function of this word picture is to support the rating of the officer as it appears in the rest of the report. While Navy points out that the check-the-box sections of the report inject a certain amount of standardization and objectivity into officer consideration,

Army acknowledges that "quite a bit of weight" is given by selection boards to the written comments.

Air Force reliance on the written word picture is indicated by the efficiency report itself. Almost the whole back page is space for the reporting officer to fill in his own comments.

On specific matters, the Navy Fitness Report form is probably the most detailed. One typical instance is a question put to reporting officers asking them whether they would want the officer in question under their command in "the requirements of war." Neither Army nor Air Force include this question, reasoning that if the overall report is adequate, this question will answer itself. Navy feels that because war is their ultimate reason for existence, this question sums up the officer's ultimate value to the Navy in short answer form.

Navy also has—as does Army—a section in which the officer is evaluated for ability to perform other duties than the one in which he is serving at the time of the report. Navy provides that any "Outstanding" or "Adverse" ratings must be explained and backed up with specific instances. If a Navy officer is rated by the reporting officer as "One of the few outstanding officers I know," the reporting officer must say how many officers he has placed in this category in the group of reports he turns in. The Navy Fitness Report is also the only one which indicates whether the officer under consideration has seen the fitness report.

Air Force and Navy specify that an officer who has received an adverse report be shown that report, and be given an opportunity to answer his reporting senior. Air Force even provides a board for review of fitness reports, to which low-rated officers may appeal. While an Air Force officer on this board admits that many appeals are simply complaints about low scores, there are often legitimate excuses.

In one case a WAF captain in the medical service was assigned to work under a first lieutenant, and as a result, there was a considerable personality conflict. The captain's efficiency reports, which covered a period of three years, were subsequently dropped from her records. Not only were they non-representative of her actual worth, but they were filled out and turned in by a junior officer.

Army is the only service which presently specifies that an officer does not have to see an adverse efficiency report. They feel that the report will tend to be more accurate if not subject to rebuttal. However, Army admits there are two definite schools

of thought on this, the other being that the officer under consideration should have a chance to speak for himself.

One Army Personnel officer puts it this way: "We're damned if we do and damned if we don't, and we have very outspoken people on both sides of the fence. Our present policy on this is by no means firm—we move from one view to the other."

Army efficiency reports, although they are considerably more detailed, rely just as heavily on written comments as do the Air Force's. Says Army Col. James McGuire (DCS-Pers), "The comments are very, very important. If a man has a definite trait, good or bad, nine times out of ten it will show up in the Efficiency Report comments."

Areas of consideration on the Army form are (1) Duty potential, including such items as liaison, diplomatic, public relations and combat duty, (2) traits; qualities, and characteristics, (3) promotion potential, (4) overall value



*Patience isn't enough . . . Promotion's are based on demonstrated potential.*

to service, (5) performance of present duty and (6) comments.

The simplest efficiency report is that of the Air Force. The only check points as performance factors, and overall evaluation. The first of these (which is represented in some form on both other service's reports—almost word for word on Navy's) evaluates the officer on job knowledge, cooperation, judgment, management qualities, leadership, communication facility and promotion potential. There is also space for any additional factors which could influence the officer's promotion chances.

The second—overall evaluation—compares the officer with other officers in his same grade. As insurance against indiscriminate over-rating, any outstanding ratings must be endorsed by a General Officer.

ARMED FORCES MANAGEMENT

The Air Force Efficiency Report is designed to give the reporting officer freedom to comment—in his own words—on the officer under consideration. Obviously, Air Force feeling is that all of an officer's qualities, good or bad, will be best and most honestly expressed in the reporting officer's own words.

Because Air Force has recently eliminated all instructions on the report itself, to direct reporting officers' attention to detailed instructions for filling out these reports in AFR 36-10, it is interesting to look at these directions.

## Be Specific

In part, the AF directive reads: "If your comments are factual and specific they will be concise. This section is not intended as an outlet for the frustrated writer. Grandiose style, luxuriant language, and superfluous adjectives are not the means to a factual report. Say what he (the officer reported on) did. State the example and define the manner . . . Although identification or elaboration of duties may be necessary in citing examples of specific achievement, the emphasis . . . should be on how the officer performs these duties and not merely what they are . . . The key to writing good comments is to describe the officer's performance, rather than to list adjectives describing the officer."

Although each service has its own officer needs, the above Air Force suggestions are calculated to give a thorough, concise picture of the officer who is being considered. When looked at from the standpoint of selection board members—who must often consider several thousands of officers, a clear, careful efficiency report is an absolute necessity, and anything less is inexcusable.

Because of the volume of work that selection boards must handle in a relatively brief amount of time, the surest way of giving a promising officer the best possible break is to write him up clearly and precisely. The overworded comment on the efficiency report is quite likely to be scanned carelessly or overlooked entirely.

Because they are the heart of the promotion systems in all services, the promotion boards, and the way in which they operate, are worth considerable attention. At the poles are Air Force and Navy, with the former having a system which is generally more de-centralized than either of the other two services.

Navy, which works virtually without a temporary/permanent promotion breakdown (although there are both kinds of promotions, they usually occur

simultaneously), is able to work with one board per rank per year. Army is roughly in the middle of the road, being more centralized than the Air Force, but less than Navy.

Navy has one separate selection board for each rank in every specialty. The board membership reflects the specialties of the officer it is considering. For straight line officers, the original nine line officers will consider. For such specialties as Engineering Duty Officers or Medical Officers, additional members will replace junior line officers on the board. At no time are there more than nine officers on the board, but these nine will be balanced to reflect the specialty of the officer under consideration.

Typical of all services, Navy board members are picked so that all are senior in rank and experience to the officers up for selection. Also, the board members are picked for "experience. Everything possible is done to eliminate prejudice or any suspicion of prejudice."

When they go to work, the boards consider the officer solely on his record. In the Navy Officer personnel record are included efficiency reports, letters of commendation, duty record and any citations the officer may have. Also, there is a space where the officer under consideration may submit to the selection board a letter pointing out any item in the record which he feels would help him.

## Duty Decides

With all other things equal, Navy promotion boards will use the duty the officer has had as a deciding factor. The idea is to cut out officers who have consciously avoided difficult duty or responsibility. According to BuPers, this sort of determination gets into the "nebulous area of career management." But on the other hand BuPers feels that "all officers have a reasonable amount of control over their own career destiny. The details assignment officers bend over backwards, and the officer can pretty well steer himself through his career."

One problem that the services must each face is that of the supporting officer, or those officers who are not strictly line. In the Navy, there are presently seven staff corps categories (Medical and Supply are examples). The Army has fifteen different branches, and the vast numbers of Air Force officers assigned to such Commands as Air Materiel Command and Air Research and Development Command also fall in this category.

In both Army and Air Force (with minor exceptions) these groups of officers are lumped generally with line

officers, although there is, in the Army, some attempt to represent as many branches on selection boards as is possible.

In the Navy, these officers (who represent roughly 17% of total officer strength) are placed on a running mate system. As is true of the Efficiency Index in the Army (see below), the Navy's running mate system has been subject to much criticism through misunderstanding. The major purpose is to represent a reasonable date-of-rank for those officers who have spent extra time preparing for their specialty before going on active duty.

## Why Running Mates

The line running mate is not an anchor around the neck of the staff corps officer. The line officer/mate can be, and often is passed by his non-line counterpart. If this occurs, the non-line officer simply gets another mate, to reflect his new status.

In the Army, the board of selection is composed of only five officers, who are "senior by grade and temporary rank to the officers being considered." While one Army officer admits "There is no regulation that says we have to throw in general officers," Army tries to weight its boards according to the rank being considered. While it is impossible to represent each of the Army's 17 branches in each board of selection, Army does the best they can. As do the other services, Army "very carefully screens" its board members for both record and pattern of experience. The entire board works on each officer considered, avoiding the "obvious difficulties" inherent in the Air Force system of committees.

While the smaller number of members on the Army boards would seem to slow the consideration process, there are advantages. First, says Lt. Col. Sam Hays, of the office of the Deputy Chief of Staff for Personnel, "The fewer people we have on our boards, the fewer there are that are likely to know someone up for consideration." Also, with the smaller board, it is easier for the members to work in close coordination.

To prevent the small group's job from becoming overwhelming, Army has devised an Overall Efficiency Index system. While this is, from the standpoint of the selection board, a reasonable and necessary tool, the OEI is probably one of the most criticized devices in any promotion system in any service.

The OEI, oversimplified, is a numerical system for rating officers in lineal order, in which ratings received on Efficiency Reports are averaged.



For each year's service, an officer's efficiency reports are indexed, and these indices are totaled in turn each seven years. Contrary to ideas held by many people, the OEI is not, has never been, and cannot be the sole basis for officer promotion. It is merely a means of giving Army selection boards a starting point, from which they can begin a preliminary screening of the officers considered.

Basically, the theory behind the Officer Efficiency Index is this: In any group of officers up for promotion, there will be a group at the top of the list who are clearly outstanding, and a group at the bottom who obviously are not ready for promotion. In the middle, of course, will be the great majority of the officers who must be carefully considered before a decision is made.

The function of separating these three groups is handled in the Army by OEI. In the Air Force, this function is handled often in the various Air Commands before nominations are submitted to Air Force Headquarters. In the Navy, this preliminary breakdown is run by the board itself. But in all three services, the process is inevitable.

Army's final selection of officers is necessarily typical of the three services, because it is simply "a matter of judgment," in the words of Lt. Col. Hays. The efficiency reports, academic reports (although they are used more in assignment work), commendations and recommendations or citations are all considered, but in the final analysis, it is the judgment of the board—and that alone—which makes or kills a promotion.

## Boards Are Independent

This basic fact is emphasized in that the final board procedures in each of the services are set up by the boards themselves. The personnel offices will brief the board members on the basic ground rules for promotion selection, but from that point on, the whole show is in the hands of the board president and his members. The fine points, the specific operating methods and the means for final selection are all in the hands of the board.

Because of its semi-decentralized nature, the Air Force temporary officer Promotion Board System is probably one of the most difficult to describe. As is true in Army, the Air Force promotes its officers below field grade on the "fully qualified" method—quotas are not brought to bear. (Navy draws this line at promotion to LCdr.). Because of this, the Air Force Commands will submit to Air Force Headquarters a list of likely prospects for promotion.

Air Force Regular Promotions are handled entirely at Hq., USAF. Because temporary promotions in the Air Force are handled differently for different ranks, it is necessary to treat them separately. For first lieutenant promotions, all work is done in the field by Major Air Command Boards. To Captain, Air Force uses what it calls a "decentralized/centralized system."

The Major Air Commands rate the officers in one of three groups: (1) Exceptionally Well Qualified for Promotion, (2) Qualified Beyond a Doubt, and (3) Not Yet Qualified. The Officers' names, together with the ratings, are then sent to Hq., USAF for Board consideration.

There the Officer's record is considered. In it are his picture, letters of commendation, derogatory material which he cannot revoke or appeal—such as Court-Martial convictions, a letter or letters from the officer himself pointing up anything in the dossier which he feels will aid him, his efficiency reports, and a complete list of schools he has attended with his flight status.

This record is considered by a nine-man board. The board has the power to revise his field rating down, to achieve standard rating throughout the Air Force, but cannot raise his rating. To speed the selection process, the board is broken into nine-man panels, and these panels vote yes or no on the officers. If there is any dissention, the officer's file goes to another panel, and continues to do this until there is a five-out-of-nine majority either for or against.

For field grade officers, the Air Force uses the Best Qualified method of selection. Under this, the Major Commands nominate the top twenty percent of their prospects for promotion. (This percentage can vary for administrative purposes.)

Under best qualified selection, the panel members do not vote, but rate the officer from one to ten points. If there is a point spread greater than two points between any evaluation, there is an attempt to reconcile the difference, but if this doesn't work, the record under consideration is sent to another panel. When all officers under consideration have been rated, they are lined up numerically for a quota cutoff.

In this linear-type rating, Air Force works hard to be sure each of the three panels will rate similar officers in the same way. The aim is to avoid over-rating, under-rating and the "trend to the middle." Monitored by Air Force Personnel Officers, the panels are run through a test case which usually takes the better part of an

entire morning. When the test is complete, the Personnel Officers conduct a thorough critique, and then try to balance the considering officers to obtain a fair selection process.

Air Force selection boards are picked at random to represent all "line" types. The various medical branches in the Air Force are the only officers not considered line, and when they are considered, an AF doctor is present on the board. Rank on the board is necessarily senior to the officers being considered. For promotion to Captain, the board is composed of all colonels, and as the rank considered goes up, the board takes on General Officers at a corresponding rate.

## The Basis

The beginning of the promotion systems in all services is the Officer Personnel Act of 1947, now codified in Title 10 in the U.S. Code. It is here that the officer/total strength ratio is set, and it is here that the services must begin. Although temporary promotions are also set by law, they are in the hands of the Service Secretaries, delegated by the President. From there, it is up to the services to fill the slots with the best possible men.

They work necessarily within the Congressional limits, and because of this, one of the biggest problems is attrition. Ideally, natural attrition would be all that was needed. With a "normal" flow rate, there would be enough officers retiring, dying and being promoted to open slots for their juniors. Unfortunately, this is far from the present case. The tremendous surge of officers in World War II has created a flow rate that is, in many cases, virtually non-existent.

As a result, officer promotions are considerably harder to come by than would otherwise be true. Army has weathered fairly well—spot promotions during Korea and World War II itself have served to spread the promotion hump.

Navy, with acute rank saturation in Cdr./LCdr. grades, unblushingly needs legislation to straighten themselves out. The new law would allow involuntary retirement for twice passed-over officers.

In the Air Force, one colonel sums it up neatly: "There is no question that we have the toughest hump problem. We can arbitrarily adjust service time factors to control hump requirements. We don't need legislation to handle the hump, but what we do

(Continued on page 32)

ARMED FORCES MANAGEMENT

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# Why the Speed-up in MAAG Training

*Less than one percent of the officers assigned to Military Assistance Advisory Groups have previous MAAG experience. On the other hand, the Military Assistance Program, one of the most vital (and most misunderstood) elements of U.S. Defense, is demanding more and more of its managers.*

**T**HE Military Assistance Program, says Defense Secretary Neil McElroy, is "without question, an integral and vital part of our own defense effort. It provides us with much more security at less cost than if we were to attempt to attain the same capability through our own resources alone.

"It is my firm conviction, and that of the Joint Chiefs of Staff, that this program must be continued. Any slackening on our part would set the example of the most powerful nation in the free world cutting down on security without regard to the realities of the threat, and would almost inevitably result in a dangerous lessening in the will and capability of our allies to resist."

In the six-year period prior to 1950 formalization of the Military Assistance Program, 14 countries (representing 722 million people and 5 million square miles of territory) were either conquered or came under political control of the Kremlin. In the eight years since, the same thing has happened to only two countries, Tibet and North Viet-Nam.

These figures, of course, give no indication of Communist gains or losses in internal subversion and psychological warfare nor is there any way of proving what might have happened if there had been no assistance program for the last eight years. But even with such limitations in mind, the trend gives a clue to the strength created by the program.

About 15 months ago, however, a storm blew up on the MAP horizon, precipitated by the then-Secretary of Defense Charles Wilson's 12 percent across-the-board defense spending cut. Although MAP was one of the few programs not ordered to take the cut, the Assistant Secretary of Defense for International Security Affairs (who is responsible for managing the program) was asked to see if the program could withstand such an economy wave.

The request touched off a month's feverish activity. In pausing to look back over their shoulders at the military assistance effort, ISA discovered some startling trends. The big one: work of the Military Assistance Advisory Groups was becoming vastly more complicated and would almost certainly continue to do so.

In the bill of particulars: in 1950, when the first MAAGs were set up in Europe, the administrative problem was relatively simple. France, for instance, was a defeated nation. Military strength levels had nowhere to go but up. There was a good deal of excess U.S. equipment already there. First build-up priority, naturally, went to ground forces and, because the bulk of their equipment was not as technically complicated as, for instance, an aircraft, training in maintenance and operations was not particularly difficult.

Nor were there any major problems on appropriations. Although the money appropriated in 1950 was just about half (\$1.3 billion) the current spending

level, its use was concentrated principally in one area, Europe.

As the years rolled by, MAAG responsibilities mushroomed. Appropriations inched upward but their allocation thinned considerably as MAP spread around the world. Programming a nation's assistance plan became more complex, records of assets larger and more diverse, evaluation of how well a nation was using the equipment more difficult. (One of the tenets of the Mutual Security Act is that equipment received must be properly maintained and efficiently used; recipient nations must permit U.S. inspection.)

As the aided nations grew stronger, evaluation of how much they could do for themselves became more important, added another stone to the MAAG burden. (Another MSA rule: emphasis must be on self-help.) What is more, advanced weapons are now being put into foreign arsenals and, at the same time, conventional forces need modernizing—a new wrinkle the MAAGs are facing to an ever increasing degree.

Henry C. Newton, director of the new Military Assistance Institute, shows part of the 800-volume library to Army Deputy Chief of Staff for Operations James E. Moore. Behind Moore, former Assistant Secretary of Defense for International Security Affairs Mansfield Sprague and the present ISA military advisor, Lt. Gen. Clovis Byers, discuss the school's future.



In addition to the logical increase in requirements dictated by an expansion in the program, per se, carrying it into the Near and Far East generated new headaches peculiar to the area. These underdeveloped nations (compared to Europe) needed more extensive training in equipment use. MAAGs had to organize field training teams and, for this basic reason, these MAAGs are generally larger than their counterparts elsewhere.

Also, the political aspects of the program took on greater significance—this being particularly true in the underdeveloped areas. The MAAGs, as members of the Country Team\* were called upon to contribute to economic and political evaluations made by the U.S. Embassies and ICA missions. Moreover, MAAG personnel were required to interpret these analyses and to make a practical application of these data in isolating country requirements or deficiencies to be met through MAP.

Closely related is the responsibility for sales negotiation primarily within the NATO area. This involves encouraging and assisting the more able countries to buy from their own financial resources that materiel and equipment which would meet the highest priority military requirements, according to the over-all collective security defense arrangements. This calls for long-range planning on the part of the MAAGs to insure that the countries obtain the maximum defense from their limited budgets and that direct purchases of items effectively complement assistance received from the U.S. as grant aid.

How well equipped were MAAG people to do all this? Here again, ISA ran into some startling facts. Among them: less than one percent of MAAG assignees have had previous MAAG experience. (Because they had so few repeaters, Navy didn't even bother with a formal report.) This situation is mainly attributable to two factors: the newness of MAP, and need for maintaining a constant officer career development pattern geared to the demands of their individual services.

Virtually no attempt was being made to replace experience with education. Military attaches receive an average of about 14 months orientation, counting language education, in preparing them for duty in the coun-

try to which they are assigned—as much as 24 months in some cases. Other "team" agencies spend approximately nine months training assignees. By contrast, new MAAG chiefs and a selected few other persons were receiving what amounted to a five-day walk through the Pentagon and language training in some instances. Most of the men assigned under them weren't offered even that, in most cases went into a country cold.

This meant a minimum of three to four months spent learning, and making mistakes, in the field, cut a man's value from 25-50 percent (based on an average duty tour of 18 months, a maximum in some cases of 12—including travel time).

ISA's solution, which they sold to Wilson on his last day in office (October 8, 1957) at an Armed Forces Policy Council meeting: set up a school to give MAAG assignees the big picture on MAP and the region and nation to which they were going. (It was assumed that the officers were already competent in their technical field. However, to double check, ISA studied personnel selection procedures, found they were exceptionally good. Through a nominating and screening process, MAAGs were being supplied with officers carrying better performance records, a high degree of technical competence and a noted ability to get along with people).

ISA's claim: "We can live with the reduced budget personnel ceiling and still handle our expanding responsibilities, at least for the present, if we can increase the quality of MAAG personnel, and offset part of the cut by hiring a greater number of indigenous personnel (whose wage scale per man is a great deal lower)."

It took until 20 February 1958 to scrape up the money, issue the directive to set up the school, required another four months to select a prime contractor (American Institute of Research), pick a director for the new Military Assistance Institute (Brig. Gen. Henry C. Newton, USA, ret.\*)

*\*An architect by profession, 63-year-old General Newton climbed to the rank of brigadier general, USAR, in 1949, first jumped into prominence as a military school administrator when he organized and commanded the Armored Force Officers School during World War II, later commanded and/or organized the one-time U.S. Constabulary school, the Kitzengen Training Center in Europe, reorganized the Army Intelligence School and then sat high on the staff of the Armor School at Ft. Knox, Ky., from 1952 until he retired in 1956.*

and find an appropriate school site (part of one wing in Arlington Towers, a modern apartment house development five-minutes ride north and west from the Pentagon).

On 20 June, working against an extremely short deadline, Newton and a construction crew invaded 18,000 sq. ft. of floor space and bare concrete storage rooms on the first and basement floors of Arlington Towers. Less than three months later, on Labor Day, painters and carpenters cleaned up and left. The first class of the MAI filed in the following morning.

Assembling its permanent, salaried staff of retired Army, Navy, Air Force and Marine Corps officers from all over the country, MAI is operating on a \$300-325,000-a-year budget—meaning it costs approximately \$280 to train each officer. (This, of course, does not include travel and per diem costs). Running 10-12 classes a year, MAI is pumping about 100 officers (or roughly 50% of the officers assigned to MAAGs) through each four-weeks course. October class, for instance, had 97 students going to 16 different countries.

## School is Different

The school differs from the usual pattern in military education annals because officers here are under orders to go to the specific assignment for which they are being trained. Every penny spent is directed toward producing an immediate end result.

Some two months before arriving at MAI, an assignee receives a packet of instruction materials, including language records, books, etc., is expected to digest it before his arrival. To make sure he has, although they don't announced the grade, MAI gives each man a 150-question test on the material when he arrives.

To make the knotty problem of housing and car parking as painless as possible, MAI holds a block of bachelor and family apartments in Arlington Towers and the nearby Presidential Arms open for new students, assigns each man a private parking space for his car at the school site.

The Institute plans its instruction four classes in advance because courses must be tailored to eventual geographic destination of class members. Classes are instructed as one group during early part of course, then separated to study region destinations, splinter into even smaller groups at tail end of course to study specific countries. Even officers' wives are offered some of the social and economic-type briefings.

Three different types of courses are given during any one class: a "regu-

ARMED FORCES MANAGEMENT

lar" course; a programming course for men destined to handle MAAG programming, a complicated and involved technique all by itself; and a course for men who are to become MAAG chiefs.

Although all MAAGs were contacted on what should be taught at the school and MAI's library now has 300 catalogued titles, 500 more in the mill (covering U.S. foreign policy and information on 65 foreign countries), Newton and his staff are not stopping there. Four months after leaving the Institute, officers will receive a questionnaire from which MAI hopes to get a reaction on how the course helped, pick up new information on the country.

In addition, Newton is visiting the Asia MAAGs this Spring, will have his officer instructors in the field every year. "If we don't, we'll get an ivory tower concept here." ISA personnel, many of whom have lectured at the Institute, feel the course is good. How well are they doing? Said one graduate, "This course has prepared me better for the new MAAG than my previous MAAG experience."

That one comment notwithstanding, it is too early to tell. Because the school cannot hope, in just four weeks to do a great deal more than just expose the officers to the problems, it must rely on student desire to learn for results. "It depends," said Newton recently, "on the interest of the officers and their experience. We're shooting for the school plus one month in the assigned country to do the job."

With the increasing complexity of the Military Assistance Program, the school has probably arrived none too soon, may even have to increase its present 100-student capacity in the near future. Goal at present, however, is exactly what is now being accomplished—sending 50% of officer personnel assigned to MAAGs through the school.

In discussing whether MAP is worth all this commotion, Lt. Gen. Clovis E. Byers, ISA military advisor (who has spent 12½ of the last 15 years outside the U.S.), said recently, "The American soldier is the best emissary the U.S. could send overseas."

Pointing to some of the expressions of profound gratitude he personally has received from hard-bitten foreign soldiers, Byers added, "MAP is the medium by which the intent of the American people is transmitted most effectively to free nations of the world. No matter how many mistakes we make, it is still a fantastic thing—the results we are getting. This school is designed to get the most out of the men who accept the responsibility."

## What You Should Know

### About the Military Assistance Program

#### Who Runs it . . .

In organization terms, Defense Department spends the money, under State Department broad policy guidance. Amount of aid to each nation is primarily a result of force objectives recommended to Secretary of Defense by Joint Chiefs, adjusted to fit budget appropriations. The MAAGs play a key role in determining these highest level military needs. However, aid is given only if the nation involved asks for it and they are unable to meet it from their own resources.

#### Who Administers it . . .

Total MAP personnel spread around the world is about 10,700—to which add some 6100 indigenous persons hired either by State or the Military Departments to help. Of the total (16,800), approximately 8800 handle direct-contact, day-to-day, administrative and training requirements of the Military Assistance Advisory Groups. Army furnishes about 70% of U.S. MAAG personnel. By geographic location, 18% of MAAG people are located in Europe, 20% in Middle East, 62% in Far East.

#### What it Costs . . .

Since program began in 1950, U.S. has spent almost \$20 billion on military assistance. (Our allies have spent, during the same period, over \$120 billion in the joint defense effort.) Spending for last four years, and probably the next two or three, has been at rate of just over \$2 billion a year.

#### What the Money Represents . . .

In yearly expenditures, about half of so-called U.S. "foreign aid," or roughly three cents of every tax dollar. Eight-five percent of MAP funds are spent in U.S. to buy military hardware for allies.

#### What it Helps Buy . . .

In addition to an intangible, and invaluable, good will, the real hardware built up in assisted nations since 1950 includes: Army—a jump in allied ground forces of 35 percent, from 3.6 to 4.9 million men, better trained, better organized and better equipped; Navy—2500 combat vessels, an increase of 108 percent; Air Force—aircraft increased from 16,000 conventional and 600 jets to 18,000 conventional and 14,000 jets—a twenty-three fold increase in jets.

#### Where the MAAGs Are . . .

U.S. provides some form of military assistance to approximately 40 nations. MAAGs are located in and carry out the assistance program for 25 of these nations (Belgium, Cambodia, Denmark, Dominican Republic, Ethiopia, France, Germany, Greece, Iran, Iraq, Italy, Japan, Korea, Libya, Netherlands, Norway, Pakistan, Philippines, Portugal, Spain, Taiwan, Turkey, United Kingdom, Viet-Nam).

#### When it was Set up . . .

Military assistance actually started with U.S. Neutrality Acts in the 1930s, has evolved out of such things as World War II lend-lease, the U.N. charter signed in 1945, the Greek-Turkish Aid Bill (Truman Doctrine) of 1947, Economic Cooperation Act (result of Marshall Plan) passed in 1948, set up of North Atlantic Treaty Organization and passage of Military Defense Assistance Act in 1949. Although Mutual Security Act was passed in 1951, its chief value was in gathering under one statute various foreign aid programs.

#### Where it's headed . . .

In spite of some vigorous attacks by opponents of the Aid Program, the present spending level will probably hold, at least for the next two or three years. Strictly from a cost standpoint alone there is strong argument it should be increased. (While the U.S. spends \$3500 annually just to pay, house, feed and clothe a U.S. soldier, the same costs for a French soldier in dollar equivalent are \$1440; a Pakistani, \$485; a Greek, \$424; and a Nationalist Chinese, \$147.)



## Why Subcontractors Run Into Trouble

by David Fromson

Secretary, Counsel and Director\*  
Greer Hydraulics, Inc.



**T**HE MATTER of Industry-Government relations is "as important as any other group of problems facing Industry today," says Mr. Ralph J. Cordiner, President of General Electric. He continues: "Defense requires the marshalling of the full range of American enterprise . . . As a practical matter, this usually means that large, technically qualified companies must assume primary responsibility for taking on the hard, unsolved problems of military technology, as well as for the handling of the overall coordination of complex projects."

Any understanding of the subcontractor relationship would indeed be incomplete were there not an acknowledgement and understanding of the weapons system concept as first announced by the Air Force in 1952 and crystallized in AFR No. 70.9.

Initially, subcontractors accepted this doctrine with reluctance. This apprehension is understandable. Prior to the weapons concept, the prime, on a major project, might have under him 3 or 4 basic subcontractors, each issuing subcontracts in turn. Under the weapons concept, the tendency is to give the prime power to issue direct subcontracts to 15 to 20 subcontractors. Current procurements usually cover projects which are developmental in nature and lack previous valid points of comparison for price evaluating. Therefore, tendency is to use redetermination to safeguard the interests of the weapons system manager. Auditing cost schedules and negotiating prices with a larger number of first tier subcontractors has worked a financial hardship on many companies. This results from overwhelm-

ing administrative burden on the weapons manager. Adequate audit personnel must be a prime requisite to cut otherwise protracted delay.

The Government viewpoint is well known. That prime contractors have complied with this obligation may be found in recent studies—of each procurement dollar given to the prime contractor, 40% is subcontracted.

When, under government contract, legal differences arise between prime and subcontractor, we meet one of the first subcontractor problems. Will Federal or State law control in adjudicating his differences? On the one hand, the Supreme Court says that "any matter involving the Government's purse is to be governed by Federal law." Nevertheless, there are some decisions holding that State law applies. Most opinion seems to be in favor of Federal law. A possible reason for this weight of opinion is the realization that in the final analysis, the Government is the real party in interest who receives and pays for the work.

We know, of course, that the United States cannot be sued without its consent. By special legislation, such as the Tucker Act and the Contract Settlement Act, the subcontractor will be allowed to enter suit against the Government even though no privity of contract exists. As a general matter, however, the subcontractor has no direct contractual relief from the Government. This was not always the case. At one time the theory prevailed that the subcontractor's contract with the prime was for the benefit of the Government and that if the prime defaulted or received full payment, the

subcontractor could collect from the Government.

This, and other doctrines now are only of historical interest. Generally speaking, based on rulings of General Services Administration, General Accounting Office, Comptroller General and Court of Claims, the subcontractor will be granted no relief directly from the Government unless contractual privity exists.

Prime contractor responsibilities are well defined under the weapons concept. But the term "subcontract" has a wider meaning under Government procurement than under common law. Under procurement regulations, the subcontractor is defined as "one who undertakes a portion of the work for which another contractor has obligated himself."

The subcontractor is, in the public mind, associated with small business, and the impact of the Small Business Act has emphasized the need to use small business skills and services. The DOD has directed prime contractors with prime contracts over \$1 million to set up appropriate small business subcontracting programs. This is a continuing effort and real progress has been made.

While the Government encourages the broadest subcontracting coverage, there remains a need to revise certain contractual clauses imposed upon subcontractors. With fixed price contracts, exposure to these mandatory clauses by the subcontractor is reduced to a minimum and the prime contractor has substantial subcontracting flexibility. Each of the Services, however, invokes substantial control under cost-reimbursable prime contracts. In such cases, the subcontractor, although enjoying no privity of contract with the Government, is obliged to accept restrictive clauses.

No uniform pattern exists among the Services in connection with this overall control. In the Air Force, the prime contractor with a fixed price contract can subcontract on his own terms, subject only to Air Force approving his subcontractor as a bona-fide supply source. In Army fixed price contracts, the prime is given complete subcontracting freedom, and need not secure subcontractor approval even when the prime contract contains a price redetermination provision.

In the Navy, there is minimum subcontracting supervision. Prior to award, the Contracting Officer and prime determine how much subcontracting is required and write into the contract specific subcontract provisions. It is apparent that there is a need for unified Government attitude as to overall subcontracting control.

There does exist a common thread

\*Mr. Fromson has supervised contracts administration for Greer Hydraulics, Inc., and also served as chairman of the Special Tasks Committee of the National Security Industrial Association's Procurement Advisory Committee. This article is based on a presentation he made as chairman of that committee before industry/Air Force representatives at Wright-Patterson AFB, Ohio, recently.

through the entire subcontract fabric, regardless of Agency or Service involved. In all cost reimbursable contracts, the cognizant audit agency can investigate both the prime and his subcontractors. The survey includes management techniques and capabilities. For the average small businessman, it is costly and inconvenient to receive the audit team or to comply with the auditor demands, which often appear unnecessary and costly. It should suffice for the subcontractor to submit to his prime, under a certified public accountant, his cost systems and managerial skill information.

All prime fixed price and cost reimbursement contracts now require a standard termination article. But the prime is not required to hand this down to his subcontractor. As a matter of practice, it is a rare subcontract which does not include the standard termination article. When the prime is terminated, it is his responsibility to promptly notify the subcontractor.

The subcontractor is particularly vulnerable if the prime is declared bankrupt. Such subcontractors are generally without statutory protection. There is no direct obligation upon the Government to settle directly with subcontractors. Under the Contract Settlement Act, the Government has power, but no obligation, to pay the subcontractor and this is so where the prime has been terminated or having completed the contract, failed to pay the subcontractor. However, unless the Government assumes this liability, the subcontractor is without relief. There is an urgent need for specific legislation authorizing the Government to pay the subcontractor who has fully performed but who has not been paid by the prime.

The standard "disputes clause" under ASPR, is a mandatory provision. There is no requirement that this be extended to subcontracts. As a result, the subcontractor has no direct appeal to the Contracting Officer in the event of a difference with his prime. At the option of the subcontractor, this right should be granted. In some cases, the prime may interpose a request for relief on behalf of the subcontractor, but this places the subcontractor in a position of requesting a favor rather than receiving a right. There is policy opinion that the Contracting Officer may intervene when the Government is financially interested, but there is no requirement that he do so.

It is axiomatic that timely delivery is an essential to efficient procurement. In emergencies, time may be vital, and delay irreparable. Where delays arise beyond the control of Government or prime contractor or his subcontractor, it must be assumed as a

calculated risk of doing business. But attention must be paid to those delays caused by administrative processing of contractual instruments or by provisions contained in the contract.

The original premise is that any delay is costly. Aside from other consequences, these costs will be paid by the Government, directly or indirectly. Where the delay is traced to the Government or the prime, the resultant chain reaction hurts the subcontractor. It is therefore, necessary to reduce delays at all points.

Delays creating additional costs and inconvenience may be found in a number of areas—for example, the extended 4 to 8 week period before the prime is advised in writing that the contract has been executed. In the interim period, the prime and his sub must determine whether to hold their labor personnel, schedule production, or order components, for when they do any of these things, it is at their own peril. The Government position is that until the agreement has been executed by the Contracting Officer, the Government is not bound.

We also find serious delays in Government procurement in pricing and provisioning of tools and spares. Contractors find serious delays and excess expense resulting from current administrative procedures necessary to receive an approved spare parts list. It is often impossible to schedule spare parts production economically since it is impossible to preserve production continuity. It is a difficult task to convince the Contracting Officer that original estimates envisioned production continuity while subsequent manufacture involves multiple setups, shifts in personnel and related factors.

One broad area for continuous delay is in contractor or subcontractor inability to secure prompt specification change confirmations. Once again, the supplier must take a calculated risk. The dynamics of the procurement function inherently calls for the use of change orders. But there is an urgent need to reform current procedures, eliminating unreasonable delays in completing such change orders.

A further area of delay traceable to Government action or inaction will be found in the attempt to utilize Government-furnished facilities or property. As a practical matter, the contractor must confine use of the equipment to Government orders and cannot use it for commercial work except with the Contracting Officer's approval. Without this approval where rental is paid, such leasing costs are generally higher than commercial sources. If Government-furnished property is to improve efficiency in production and reduce costs to the Government, there

must be a radical change in facility contract requirements.

Fixed price supply contracts must include a standard default clause. For the cost reimbursement supply contracts there is no uniform or required "default clause"—the subject is treated under the termination and/or excusable delays article. In the standard default clause, a distinction exists between failure to make delivery of supplies, whether such failure endangers performance of the contract and whether or not the failure is pertinent to delivery or performance. If default is due to the first cause, the Government must give 10 days notice to the contractor. Also, the nature of the default determines whether or not the Government is justified in terminating the contract.

Regardless of contract type, the defaulting contractor is excused if the cause of the delay are beyond his control and without his fault or negligence. In fixed price supply contracts the Government may terminate for default (as distinguished from termination for convenience). But in such case, the contractor is liable for excess procurement costs. In the cost reimbursement contract, the Government may terminate for default only where the contractor is negligent.

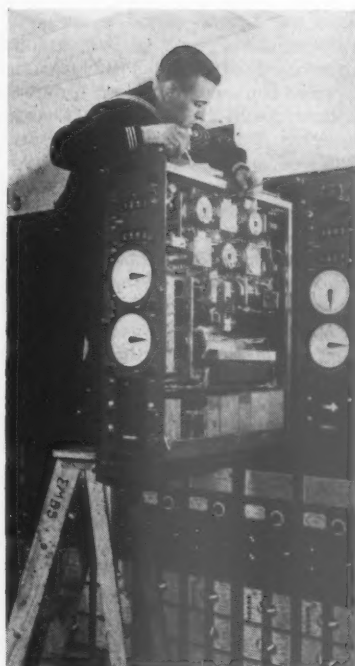
The default clause will relieve prime contractors from liability for excess costs if the fault is traced to the subcontractor. As a result of this, a subcontractor default generally excuses the prime from liability from termination for default. However, the reverse is not true. Where the prime defaults, the subcontractor is without direct relief from the Government.

Before concluding, it must be said that no appraisal of the delay factor would be complete without emphatic reference to the need for adequate industry contract administration. Most assuredly, the absence of adequate technicians trained in this relatively new specialty within management has compounded the problems. There is an urgent need, through educational and training process, to improve the awareness, appreciation and understanding within Industry, of the importance of sound contract administration. In some measure, Industry must share responsibility for imperfect implementation of the Government contract.

A solution must and will be found for these serious and costly delay problems affecting Government procurement. This will necessitate the highest degree of constructive and consistent Government-Industry liaison. Through such joint effort will there be achieved the best national defense at minimum cost.

# Why Navy Will be Ready For Tomorrow's War

*Given the indisputable value of war-gaming, Navy had to develop a method which would accurately and realistically simulate today's ultra-fast battle conditions. Naval Electronic Warfare Simulator is their answer. . .*



Navy Technicians work to keep complex navigational computer working for NEWS.

THE ADMIRAL slept soundly, knowing his plans for the next day's war games were ready to go. He had hidden his entire command of aircraft under his desk the evening before for a crushing surprise attack. But in another section of the Naval War College, another Admiral, commanding the Green Aggressors, slept sounder still, for he had discovered the hidden planes and stolen them.

The aircraft had been discovered when one of the Green "pilots" had run—not walked, but run—across the balcony of Sims Hall, where the games were held. Running across the balcony was the only way that the war-gaming officials could simulate aerial reconnaissance over the checker-board tile floor in Sims Hall at the Newport, Rhode Island War College.

Model ships were used in maneuvers, and a toss of the dice by umpires often decided the outcome of a battle. Five minutes of war-gaming opened the way for the umpires—damage assessment, navigation plotting and determining results for the five minutes of gaming could easily take up the rest of the morning. The war game participants spent this time reading newspapers, drinking coffee or planning ahead—planning with time that would be non-existent on an actual battlefield.

The system, according to Rear Admiral Charles H. Lyman, present Chief of the U.S. Naval War College Staff, "worked well in the days of 15 knot ships and 10-mile gun ranges."

War-gaming has proven itself time and time again in actual practice. The Battle of the Bulge in World War II had been war-gamed at German Headquarters before its execution. The crucial military decisions in that conflict literally came out of a sand box. On our side, the successful island-hopping campaign in the Pacific had been played at the Naval War College by officers including Admirals Halsey, King, Nimitz and Spruance.

Modern warfare has faced Navy with a problem: How, in the age of nuclear weapons and multisonic aircraft, is it possible to carry out accurate, realistic and worthwhile war games? The old system clearly would not do. When decisions must be made at Mach 2 speeds, it is impossible to maintain realism with five minutes of gaming and three hours of reflection.

Because Navy anticipated this problem shortly after World War II, and at that time realized the need for improved war-gaming methods, they were able last month to officially unveil NEWS—the \$7½-million Naval Electronic Warfare Simulator at the U.S. Naval War College, Newport, R.I.

NEWS, known as the Monster, is a block-long, three story high electronic computer complex which can literally fight a battle or a war—and do it in the actual battlefield time. It is, says Adm. Lyman, "the most wonderful thing in the world for testing our doctrines of warfare." NEWS, he continues, "frees our umpires from the

ARMED FORCES MANAGEMENT





Umpire area is brains for Navy Electronic Warfare Simulator. Display screen shows running account of battles flanked by damage assessment panels.

back-breaking job of damage evaluation." The machine also plots navigation, the element of chance and detection and identification accurately and automatically.

By the books, NEWS is "a two-sided naval warfare simulator employing electro-mechanical means to provide the elements of mobility, fire power, and intelligence on which opposing commanders may exercise their professional judgment in the employment of assigned forces in a war game."

The key words are "professional judgment." While NEWS can be programmed to take twenty-four White and twenty-four Green combat forces, each with four weapon systems, (attack bombers, for instance, can carry nuclear bombs, air-to-air missiles, decoy missiles and machine guns) it is how these weapons are used that will decide a battle. The participating officers are the men who must decide how the weapons are used—and how the weapon carrier is maneuvered.

NEWS is not limited. In the twenty command centers, each of the three or four combat centers can consist of a single destroyer or a group of destroyers, each functioning as a weapon system. Another indication of the versatility of NEWS is that battle areas of 40, 400, 1000 or 4000 miles on a side can be used. Speeds for the participating ships and aircraft range up to 5000 knots, and by regulating a time mechanism, the speeds in the 4000 mile area can be accelerated to

20,000 knots—more than enough for present ballistic missiles.

NEWS can be programmed to take a weapon with virtually any characteristics that the Navy wants, whether it has the actual weapon or not. One of the major values of NEWS is that it allows Navy to try out a non-existent weapon, and can give at least a theoretical answer on the weapon's actual value. In the words of one officer, "NEWS can take anything from arrows to atomic bombs, and give us that weapon's value in a given situation."

In conducting a problem, the steps are essentially this: First, the installation must be programmed with information including the operational characteristics of the two participating forces and the weapon assignment.

In the first category, maximum speeds, altitude and depth for aircraft or submarines, rates of ascent and descent, type of radar or sonar presentation and maximum ranges, target sizes and target identifying information are fed to NEWS. With aircraft/submarine ascent and descent, the computer accurately plots the time it takes for the craft to either climb or submerge, and the system is not fully useable until that time has passed.

With target identification, each control room has a radar-type plot board on which blips may be probed with an electric eye device. Target information—such as altitude, number and type of aircraft—appears on an infor-

mation display board in the command centers.

In the second category of preparation, weapon assignment and characteristics, rates of fire, ammunition units, weapon-target combinations permitted, hit probabilities and incremental damage per hit are programmed. With this information, NEWS is essentially ready to go.

In this programming, the staff at the Naval War College has found a problem area. The job of feeding the voluminous information which must be set up on the mammoth computer is both tedious and time-consuming. While actual operation of NEWS needs a relatively small technical staff, this same staff must also put the machine in operating order before a problem is run.

The overall installation is broken down into three major sub-systems: (1) Problem Generation and Display, (2) Weapon and Damage Computer, and (3) Communications.

The first of these provides for motion control, indication and display of all forces, radar and sonar force displays within the allowable range of each command center, visual display of all forces on the Umpire Master Plot Board, and display of 14 possible fixed forces which may be programmed into the machine. Finally, this sub-system provides for evaluated Commander-in-Chief type information on detected radar targets to all command centers and to the Umpires.

The Weapon and Damage Com-

puter, which is the most recent and most important addition to NEWS, provides for assignment and control of weapons, display of engagements, storage of weapon data and automatic computation and display of damage assessment. Damage assessments are shown in percentages by the computer, and it is up to the umpires to decide what 50% damage means—in a destroyer, for instance, this could mean an overall 50% drop in effectiveness (speed and weapons capability alike) or it could mean no drop in speed with complete weapons loss.

The weapon and damage computer also provides for pre-computation and storage of weapon parameter data, assignment of the ammunition allowance and automatic control and display for each of the four weapons per force in each of the command centers, display of target damage percentages in the target command center, at the damage computer console and in the umpire control center on effectiveness remaining meters.

Also, the weapon and damage computer allows for manual modification of weapon effectiveness, indicates hits registered on a target, flashes an "under attack" light and an audio signal at each attacked command center, and actuates weapon-target status lights on either side of the Master Plot Board and on the damage control console.

The last of the major sub-systems, Communications, provides for assignment, control and monitoring of command problem and umpire communications, eight simulated voice radio networks, one teletype, one dial telephone and a problem control intercom in each command center. Also provided are facilities for the various communication networks and for monitoring and tape recording voice transmissions.

The operating areas at NEWS are the command centers. Here, there are the facilities normally available to a commander who controls and evaluates strategic and tactical situations using individual command decisions and weapon systems. These centers may be used as flag plots, air command centers, unit command centers, military command posts or as an overall command room for any or all participating forces on each side.

The heart of NEWS is the Umpire Area, where there are facilities for the umpires to exercise project direction and to evaluate the war game. Also in this area, the umpires introduce decisions and intelligence as appropriate.

The area contains radar, communications and display facilities to permit the Umpire staff and the Problem Di-

rector to keep fully informed on the developing situation and to assist them in carrying out their responsibilities. There is also in this area a 15-ft. high plexiglas Master Plotting Board, on which the entire exercise is displayed. Forces in the problem are projected on the screen by NEWS itself, and a historical line-plot of the moving forces is handled by personnel behind the screen.

Above the Umpire Area, there is a balcony which will seat a hundred observers. The balcony is also used for post-exercise critiques, and is connected with the Umpire Area by a Public Address system, which permits full discussion of the completed problem.

The duties of the NEWS Umpires are: (1) to provide uniform means for prompt determination of the likely results of each weapon delivery under average conditions, (2) to impress upon commanders the importance of intelligently operating their forces to complete their assigned missions, (3) to minimize the effect of artificialities, and (4) to assist in attaining the objectives of the operational problem.

## Cost Negligible

While NEWS can simulate operations using virtually every weapon the Navy has, the cost of running a full scale maneuver is negligible. The only money spent is for electricity and for the time of the people participating. As a result, NEWS is not confined just to the use of Naval War College students. Present plans call for the system to be used by these classes only six months out of the year, during the second half of the year-long War College Courses.

In the remaining six months of the year, NEWS will be used by fleet commanders and their staffs as a means of practice. An air defense problem run early this year by the Commander of the Atlantic Destroyer Fleet was the first of this work to be done. Not only does NEWS offer a chance for operating commanders to practice ashore, but it lets them run through planned sea-going maneuvers to detect flaws which might result in costly mistakes at sea.

As does any device of this sort, NEWS has its limitations. There is little chance of the installation ever being adapted to actual ships, both because of its size and its nature as a training device. Contrary to earlier incorrect reports, the machine will not be used to re-fight past battles in search of mistakes. It would be a waste of time in the face of recent technological developments, and would

not serve any useful purpose as training, because no two situations are exactly the same.

The greatest advantage of NEWS as a war-gaming device is that of time. Not only are previous delays for damage assessment eliminated by the machine, but hair-splitting differences on who-got-who are automatically decided. If two aircraft commanders fire missiles at the same time, both planes are destroyed. On long range engagements, the time factor can be multiplied by either two or four to speed operations until the opposing forces have closed. For evaluation, time in the war game can be stopped at any time, and if necessary the problem can be replayed. By applying this time factor to individual weapon systems, their speeds can be stepped up to as much as 20,000 knots.

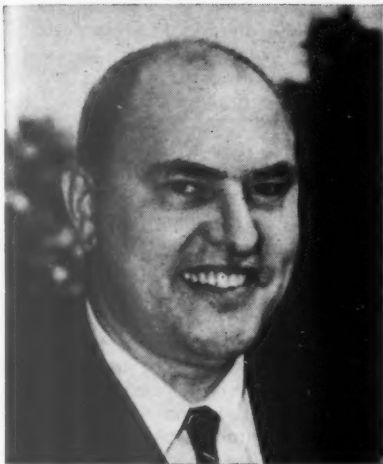
NEWS is the first major attempt to build a warfare simulator of this scope, and experience with the installation will be needed to develop its full potential. Nevertheless, the inherent design characteristics make NEWS an excellent tool for commanders to simulate and gain experience in employing forces in combat situations, using modern weapons with weapon employment translated into damage effects. The use of the electronic computer in NEWS is a novel concept. Although both Army and Air Force officers have looked over the system, it is unlikely that it will be used completely by either of these services because, in its present form, NEWS makes no allowance for terrain factors.

Before, when computers were used to assist in analyzing various aspects of warfare, mathematical models describing a rigid situation were introduced into the computer, and an outcome was generated as a result. In NEWS, the situation is not rigid, and the electronic computer aids in rapidly assessing weapon employment by opposing commanders. Skill in exercising professional military judgment is important in the outcome. This is essential in the realistic simulation of warfare for combat command experience.

The basic design of NEWS does not provide for automatic operation as a purely analytical computer. It does provide for manual variation in the variables surrounding weapons capabilities, forces and other elements of warfare. Readiness as well as experience in command decision is then enhanced by the practical simulation of combat on the Navy Electronic Warfare Simulator. The system can be used in forming sound concepts in doctrine and tactics, and in furthering the best use of Navy's weapon systems.

ARMED FORCES MANAGEMENT

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## Pentagon Profile



### *This Month: Dr. Paul A. Siple*

**Scientific Advisor to Chief, Army Research and Development**

**O**UR biggest problem is that environment causes more casualties to our men and equipment than the enemy. So said scientist, explorer, author Dr. Paul A. Siple, scientific advisor to the Director of Army Research, recently.

In that one sentence, Siple summed up most of the puzzles he faces in his little-publicized but vitally important job—environmental research. Not as formalized as most things in the Army, it is an area which has been avoided, is still being avoided to a large extent, through ignorance, lack of effort.

In simplest terms, he is responsible for seeing to it that the Army can fight, that new weapons will work, in any environment in the world. Among the reasons: the U.S. has not yet fought a war in a winter climate i.e. below freezing without staggering casualties. What is more to the point, nearly all U.S. winter fighting experience has been gained in the warmer parts of Europe.

"The Army does some environmental tests of equipment but spends relatively little in environmental R&D," reports Siple. "Primarily from our position on the General Staff we can only watch testing techniques, sit on the sidelines and heckle whether user tests, tech service tests, are authentic." Testers not acquainted with characteristics of the world's geographic areas at times cut corners, for instance, may OK a piece of equipment after desert test in Yuma, discover too late that it won't work on the Sahara. (To which the immediate retort is "Why not? They're both deserts, aren't they?" This is something like saying Marilyn Monroe and your mother-in-law are both female.)

Born in northwest Ohio in 1908, Paul Siple studied geology and biology

at Alleghany College, Pa., really did not decide what to do with his life until 1928. That year, the 19-year-old Eagle scout was tapped on the shoulder for a trip to the Antarctic with Admiral Byrd. The trip started him on 30 years of expeditionary work. He made 6 Antarctic trips in all and a few to the Arctic. He was Base Leader at Little America in 1940 and scientific leader at the Geographic South Pole in 1957. Between trips back in 1939 he completed his Ph.D. degree at Clark University in the fields of Geography and Climatology. When World War II hit, Siple was skilled in seamanship, aerial mapping and navigation but accepted a commission in the Army (where he says he possibly was less well equipped) because he saw a problem—the woeful shape of available clothing for cold weather. "We were using stuff virtually left over from Indian War days."

He was instrumental in helping modernize the entire concept of clothing for a world environment developed a clothing almanac (which uses a color matching key to show what sort of apparel to wear in overseas climates any month), has been in the man-in-environment area of research ever since, directing research toward solving the technical problems involving global preparedness of the Army.

One of his major accomplishments was developing the principle of the Army's insulated boot for cold-weather wear. Proving its value to his own satisfaction, he then spent years fighting the prejudice of entrenched (but erroneous) ideas before the boot was accepted. (In the meantime, the U.S. lost the equivalent of 10 divisions on the Western front from trench foot, retreated down the Yalu in Korea crippled as much by frost bite as

enemy bullets.)

Siple planned to start a private business after WWII until the Army R&D asked him to do for the Army as a whole what he had done for the Army Quartermaster Corps during the war. He accepted, became part of what he terms the "hard core of civilians who provide continuity and keep programs moving."

"We take quite a beating sometimes," he says, "because we have no command authority. But career civilians are unsung heroes of Defense, keep ideas advancing. They represent the only piece in the Pentagon puzzle which remains stable, the only key to what we did before—with the exception of a very small percent of the officers who do return to former assignments."

Siple immediately bumped into a salesmanship problem as bad as the insulated boot affair. It took over seven years to convince the men who control the purse strings that the research efforts of his office would be worth the money investment.

Today, Siple has an international reputation as an expert on geographic climatology, has received academic honors by the bushelful. (During one two-week stretch recently four separate universities presented him with honorary degrees.) Holder of highest Geographic medals of the American, National and Royal Geographic Societies, he is Vice President and will be President in 1959 of the Association of American Geographers, a member of the Academy of Sciences U.S., National Committee of the Academy for the IGY and Chairman of the Department of Defense Polar Research Committee.

A writer of books and letters (in answer to a regular flood of requests



covering everything from serious scientific questions to youngsters asking his autograph), Siple spends what little spare time he has doing science work in fields not tied directly to his job. For 15 years he has done earth rotation studies, feels the poles are the basis to the whole crustal history of the earth. Pursuing his "hobby," he rediscovered obscure facts known as much as 200 years ago, come up with a mechanical theory of shift-in-poles to which most geologists resist acceptance but cannot disprove.

Because of his frequent polar trips he regularly accumulates about a month's annual leave, and just as regularly loses it because there is never time to drop anything long enough to leave. The trips cause other problems: a big (6-2, 220 lbs.) man, Siple felt he would dig a hole by hand for a swimming pool in his backyard to get in snow-shoveling shape for his last trip to Antarctica. Hole dug, he headed for the pole. His wife and three teenage daughters dispaired of their own pool, promptly joined a local community pool, waited for him to fill the hole back up when he returned. "It'll probably end up as a sunken garden," he says with a wry smile.

The research pace in Siple's field, particularly the Arctic, has stepped up

recently, but acceleration comes slowly. One of the reasons is the environment, itself. Shipping supplies into a polar climate takes up an entire summer season, means to do a thing in the Arctic takes two years before scientists get an effect.

Before he resigned as Chief of Army Research and Development, Lt. Gen. James Gavin outlined to the Army Chief of Staff just how far behind the Services were in Arctic R&D. A tri-Service evaluation of intelligence left Defense agreeing with Gavin, recommending a speed-up of Polar effort. Army's present Chief of R&D, Lt. Gen. Arthur Trudeau, added only one footnote: "Let's speed up the other (tropic) environmental research, too."

The idea to speed up environmental research "needs real advanced crystal ball gazing," according to Siple. "Technical break through and fast changes in strategic and world situations makes it necessary for R&D to prepare for virtually any global eventuality."

This leads to other difficulties. Because environmental research people don't know where the Services are going to have to put their men and equipment they have to work with a basketful of varying problems, keep them all moving at once. There is a clear-cut procedure for handling en-

vironmental projects, and, because of a military division of responsibility, Siple is usually working across the board with other R&D efforts. (While the Army is designing a valve for use in firing a Jupiter missile more effectively, Siple may well be pursuing research to discover whether a soldier can make it work at all in Arctic sub-zero weather or tropic heat.)

Siple's prime effort during the past decade has been directed toward ENVANAL (code word for environmental analysis) a mechanized book-keeping system intended to provide swift aid to planners by matching the equipment performance records derived from thousands of field tests against the intelligence analysis of terrain and weather in a potential combat zone. In the past Siple explains, "This task was left up to experience and memory of individuals. Too often they resorted to million dollar bad guesses and got wrong or untested equipment into the field half way around the world. The results were costly and some times tragic. If we want a modern Army able to move swiftly on short notice anywhere on earth we have to take the guess work out of environmental preparedness and use modern technology for logistics and tactical planning."

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Car is registered in State of \_\_\_\_\_

Yr. Make Model (Dlx., etc.) Cyl. Body Style Purchase Date ☐ New ☐ Used

1. (a) Days per week car is driven to work? \_\_\_\_\_ One way distance is \_\_\_\_\_ miles.

(b) Is car used in any occupation or business? (Excluding to and from work) ☐ Yes ☐ No

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## Procurement and Logistics

**REASONING BEHIND SEC'Y McELROY'S SWITCH TO ICBM** partiality is two-fold. First, he told a Pentagon news conference, it is unlikely that U.S. will strike the first blow in an ICBM-type conflict. Tough ZI bases and additional warning time would be all to our advantage, firing from a defensive situation. Second, he said, is a matter of tight control—with the big missiles in this country, there would be virtually no danger of false alarm firings by jumpy allies.

**A STEP TO CUT BACK PRESENT ANNOYINGLY LONG LEAD TIMES** is under study by Army's Diamond Ordnance Fuze Laboratories. Basis for the plan is this: allow development engineers to stay with their project as it phases into production. Project familiarity would theoretically cut transition times, provide built-in experience. The problem: How many people would be needed, and how soon could they get back to their original work?

**DESPITE DOD EMPHASIS ON "KEEPING THE SEA LANES OPEN," SECOND ATOMIC CARRIER** for the Navy is not at all likely in next year's budget. The \$378 million price tag on the big ship will probably be more than Navy can stand, considering previous reports that they will be budgeting on about the same level as last year.

**A COLD EYE WAS TURNED ON U.S. MISSILE PROGRAMS** by Defense Secretary Neil McElroy last month. In addition to new emphasis on long-range weapons, he said the missile business is no longer young—time has come to chop "marginal" weapons resulting from early "proliferation of missiles." Example: soon-to-be decision on Thor-Jupiter IRBM's, with the wise money backing Thor.

**MARRIAGE OF SLOW AIRCRAFT, HYPERSONIC MISSILES FOR AIR DEFENSE** looks like a good bet in the crystal ball of VAdm. Robert Pirie, Navy's DCNO for Air. System would depend on top-notch warning systems, ability of the slower planes to stay on-post for long periods of time.

**DESPITE SOUND AND FURY RAISED BY REP. JOHN MOSS** of the House Government Operations Subcommittee, Air Force appears to have a position on its IG report which is both justified and—barring passage of new law—unshakable. Existing DOD Directive bars Inspector General reports from release, and AF Secretary James Douglas has told the committee that to make reports of this type public would only harm their effectiveness, forcing a watering-down of adverse criticism.

**DESPITE "FUEL-HOGGING" DRAWBACK, RAMJET ENGINES LOOK GOOD TO NAVY** for aircraft operations between Mach 4 and 7. According to top Navy aviator, Mach 4 jets, with 120,000 ft. altitude capabilities will also be used for future Navy work. For the present, Navy is most happy with North American A3J twin-jet attack craft, pointing out that the plane can work equally well in limited and all-out atomic warfare.

**INDUSTRIAL COLLEGE OF THE ARMED FORCES**, in addition to other high-level service schools, will see younger Air Force students in the future. In this year's classes, average age has dropped from 42 to 40, with service time falling to 18 years. Trend would appear to follow industry practice of identifying executive types earlier in their careers, thereby allowing fuller eventual development.

**STRATEGIC AIRLIFT WILL CONTINUE TO TAKE A BACK SEAT** to other programs, according to Defense Secretary McElroy. Not only will there be no increase, but even modernization of existing fleets has low priority. Said McElroy, "We would be glad to have more airlift. We would be glad to have more of everything."

## Procurement and Logistics

### Democrats to Probe GM Defense Business

Democratic members of the Senate Anti-Monopoly Subcommittee are looking skeptically at the "remarkable commentary" that no firm has been able to take over General Motors' top position as receiver of government contracts, "despite the great changes that have taken place" in recent years.

The critical look at GM's defense business came as a sidelight of a report questioning the corporation's automobile business for possible monopoly practices among the GM divisions.

Looking at the period from July 1950 to June 1957, the committee pointed out that GM has consistently led the list of defense contractors. Terming this situation "remarkable," the Senate group went on to say "it is clear that General Motors has been a major beneficiary under the Nation's defense program. Throughout the varied periods of World War II, the Korean conflict, the uneasy defense efforts of recent years, General Motors has stood first in the list of recipients of contracts. During that time the character of our military requirements has undergone virtual revolution, ranging from tanks in the early days to the later development of missiles and rockets."

Nowhere did the report directly criticize GM's defense activities, but it cited cases, before General Accounting Office and Congress, in which GM was alleged to have made excess profits.

### Buying Decentralization Announced by Air Force

Air Force procurement responsibilities have been further decentralized, according to Air Materiel Command Chief Gen. E. W. Rawlings. Under the new system, several items formerly purchased by the Airlines, Maintenance and Service Contracts Division of the Directorate of Procurement and Production will no longer be bought centrally.

Items falling under the new policy include: (1) Electrical generator sets, wing fuel tanks and pylons will be bought in the future by Sacramento Air Area Materiel. No date for the change announced.

(2) Tow tractors, fire crash trucks and refueling vehicles, runway sweepers portable LOX generators, packette engines and miscellaneous special purpose equipment will be bought by



North American Aviation T-39 Sabreliner, which has been ordered by the Air Force. The plane will be used as a utility transport/trainer, has a crew of two.

### Air Force Buys T-39 for Trainer Work

Air Force has placed an order with North American Aviation Inc. for immediate production of an undisclosed number of NAA Sabreliners, designated T-39. The plane will probably be used as a low cost, high performance jet utility transport and trainer by the Air Force.

Prototype Sabreliner first flew in September this year, and has been

undergoing an accelerated evaluation program by company and Air Force test pilots.

The T-39 carries a crew of two and either four or eight passengers. Cruising speed is 500 mph, and range is 1,400 miles. The 43 ft.-long aircraft has a wingspan of 42 ft. and is powered by two General Electric J85 jet engines.

Mallory Air Force Station, effective Nov. 16.

(3) B-36 dismantling program transferred to San Bernardino AMA.

(4) Machine tool and heavy press programs, including machine tool storage and multi-purpose vehicles, will be handled by Warner Robins AFB.

(5) On site aircraft control and warning maintenance, FST-2 maintenance, radio link relay, Airways and Air Communications Service scatter communications and Communications and Electronics Systems Engineering has been transferred to Rome AMA.

(6) Field team maintenance, inspection and repair of navigational aids as well International Business Machine disc control units will be transferred to Oklahoma City AMA.

(7) Air Force-wide inspection of heating boilers will be handled by Mobile AMA.

(8) Bonding of commissary exchange officers will be transferred to AF's Finance Center, Denver, Colo.

(9) Primary flight training contracts will be handled by the Air Training Command.

AMC will maintain staff surveillance and responsibility over decentralized procurement in these areas. This re-

sponsibility includes policy formulation, inter-interpretation and guidance along with periodic review and evaluation of AMA operations.

### Class I Installations Get Electronic Gear

Application of EDPS to the operation of the Army's posts, camps and stations in Class I status was given its start today when Remington Rand Division of Sperry Rand Corp. was designated supplier of Automatic Data Processing System for Fort Meade, Md.

The system consists of a Model I UNIVAC File Computer, with feeder equipment including 17 synchrotape typewriters, is a prototype chosen after a two-and-a-half year study by an Army task Force.

After studying feasibility of using the computers in the Army, the task force engaged in an engineering study which led to development of the first fully-integrated automatic data processing system to cover supply management, civilian personnel management and financial management, adequate for Class I installations.

Reasons for adopting the system in-

ARMED FORCES MANAGEMENT



cluded; (1) alleviation of increasing paperwork, (2) reduction of time needed for basic record and report procedures, (3) increased capacity for emergency work loads, (4) reduction of errors in manual handling of data, (5) predetermination of decision for automatic data processing, and (6) reduction of overall costs of data processing.

## AF Wants Earlier Funds For Ground Support Gear

Authorization and funding for needed ground support equipment will be included in early stages of research and development contracts, according to E. L. Clewell, Chief of AMC's Provisioning Office. Firm policy for this program will be included in MIL-D-9412 and MCP-71-650.

These two documents call for a complete study of ground support requirements paralleling a weapons system development program, development of a ground support mockup, and a detailed design study of the equipment.

Said Clewell, "This will provide a means of getting started sooner." Too many contractors, he said, have shown

a lack of interest in ground support equipment, and have placed too much stress on the end article. Because of this, he continued, there has been little or no ground support equipment lead time available to put the weapon into operation.

The AMC official said the new plan will aid time-phasing for ARDC and AMC review of ground support proposals, and will be a better means of providing the two Air Force organizations with the "capability to fulfill their assigned capabilities."

More stress will be placed on contractor-prepared procurement data in relation to standardization between ground support systems and weapon components. It is also felt that there will be enough time for the contractor's support proposal to be checked against Air Force equipment resources.

## Army Negotiates For M-60 Machine Gun

Army has issued requests for proposals for industry production of 5,835 M-60 machine guns. Roughly 37 firms have expressed an interest.

Final decision will be made by

## Goliath Amphibian Developed by Navy

A giant, 100-ton amphibious tank-cargo vehicle, under development by the Navy, may go a long way towards eliminating past beach congestion problems in landing operations. Nicknamed Goliath, the huge craft will be able to move across beaches and away

from shorelines.

Goliath is powered by twin 500 hp engines and carry 60 tons of cargo at 7 mph in water and 13 mph over land. The four-tracked vehicle is 46 ft. long, 14½ ft. high and has two retractable propellers.



Ordnance Weapons Command early in 1959. Springfield Arsenal is manufacturing 3,000 of the weapons, and overall cost of the program is estimated at roughly \$15 million.

Designed to use the standard NATO 7.62 mm cartridge, the new weapon is gas operated, air-cooled, belt-fed, and has a quick-change barrel. It can be fired from shoulder, bipod or tripod.

## AMC Applies Science To Management Work

Air Materiel Command has instituted a command-wide program to apply the scientific methods of operations research to many complex management problems. Operations research is a new and rapidly developing practice which is finding increased use in both government and industry.

Under the system, scientific and mathematical approaches, such as are used in physical sciences, are applied to management problems. Implementing the program, a Headquarters Operations Analysis Office has been set up in the AMC Directorate of Plans and Programs. Next step will be to create similar offices in Air Materiel Areas and Air Force Depots.

The AMC operations analysis program will be the newest and one of the largest segments of the Air Force-wide program. Similar programs exist in Hq., USAF and in operating commands such as SAC and TAC.

## Nike Missiles Slated For Alaska

Nike Hercules missiles will be operational in Alaska early in 1959, Department of the Army has announced. To replace 120-mm guns, the missiles will be located at Fort Richardson/Elmendorf AFB area and near Eilson AFB/Ladd AFB.

Gun sites are currently being converted. Five hundred officers and men, plus two Ordnance detachments will accompany the missiles. Battalion strength is planned for the Alaskan Nike command.

## Irvine Compares AF Buys With National Economy

Roughly 2% of the Gross National Product is represented by Air Force Procurement authority for fiscal 1959. Lt. Gen. C. S. Irvine, Air Force Deputy Chief of Air Staff for Materiel also said that this authority amounts to \$8.8 billion, about 75% of which will be spent for aircraft, missiles and related procurement.

Said Irvine, "This is a lot of money.

However, as an insurance premium, it represents about two per cent of our gross national product—cheap enough when you consider the stakes involved." Irvine warned that the Air Force intended to get maximum returns for each dollar it spends. This, he said, means many things, including

maximum hardware performance, increases cost consciousness, and where possible, control of weapon complexity.

Irvine stressed purchases in lesser quantities. To cut requirements, he said a modernized logistic support program has been set up, including single manager concept of weapon support, airlift of critical supplies, and comprehensive high speed transceivers for processing requisitions in the least possible time.

Indicating the advantages of shorter pipelines through use of airlift, Gen. Irvine said: "Five years ago, aircraft engines were shipped by sea carriers. Pipeline time for requisitioning, shipping and overhaul was then over 200 days. Airlift has reduced this total cycle to about 90 days. By reducing the number of engines in transit, fewer replacements are needed. At a cost of \$100,000 to \$200,000 each the savings are obvious. As a matter of fact, during 1957, savings on engines alone came to well over \$100 million. We are actually filling requisitions direct to overseas points in from seven to nine days."

Another way of cutting pipeline, he said, is the newly developed transceiver network and electronic data-processing equipment used to cut the time for preparing and submitting requisitions (see AFM, Oct., p. 24). As of now, 150 ZI and overseas bases are being served. Within another year, the total will be 220. While the system costs \$1.5 million a year to maintain, the savings are about \$2 million.

## Army is Big Business, Says Chief of Staff

Capital assets over \$50 billion in real estate, supplies, equipment and holdings, and 100 industrial plants which produce, store and distribute in the neighborhood of \$20 billion annually have put the Army on the level of big business, according to Army Chief of Staff Gen. Maxwell D. Taylor.

Taylor cited these figures before a recent convention of the Quartermaster Association. He went on to say that Army is faced with the same problems that private industry is—getting enough money and holding on to enough good people.

Taylor said that the complexities of modern warfare have forced an ever-increasing proportion of fighting men to divert their attentions to supply and support tasks, rather than actual fighting.

Taylor said that one of the major Army problems was that of turnover—each year Army loses one-third of its trained personnel to private firms which can pay higher wages.

## Promotions

(Continued from page 18)

need from Congress is more grade authorizations."

From the other service's viewpoints, it is felt that Navy has a slight edge in some areas. Says one Air Force spokesman, "Administratively, there are a lot of advantages to the Navy system." From the Army: "They [the Navy] make it easier in some ways, but there are disadvantages."

The answer seems to be that each of the services has its own unique needs, and must therefore have its own promotion system. Says one officer, "It would be damaging to set up an average system to cover all three services." By the same token, there is not now, and probably will never be a perfect promotion system. According to one Army officer, "We try to know all of our strong points and all of our weaknesses. We try to hold on to a system for as long as we can, but we also conduct a continuous program of review."

An Air Force officer was quick to admit that "there is no perfect promotion system. In any system which is aimed at the majority, somebody is going to get hurt, and some others are going to slide by without working."

Navy officers call their system "the fairest thing we've ever been able to come up with," but they are far from denying that there is room for improvement.

In each Service, as in industry, the object is to put the best man in a position where he can do the most good. If a comment by an Army Colonel sounds a little cold, it is nonetheless true—"Sure we expect our officers to do a top job. But they get paid for that. Our basic reason for promoting them is to put them in a position where they will do us the most good."

The Navy attitude is summed up by a BuPers Captain. "You could say that Captain is par for the course, but of course there are very few par golfers around. You could call the Admirals hole-in-one golfers. A hole-in-one is very damned hard to come by."

A promotion is never an automatic thing. It comes only when the officer shows that he can serve his Service better by being in a higher grade. With this in mind, it becomes obvious that an adequate job is not enough. Especially at the present time, with an exceptionally tight promotion situation, it is necessary for the officer who would be promoted to do a more-than-adequate job—a job that will prove his ability to serve his service capably at a higher rank.

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# What Repair Kits Mean To Air Force Maintenance



*Tremendous savings in both dollars and administrative time have resulted from the Air Force Repair Kit program. Based on a fairly simple idea, the Repair Kit system emphasizes simplicity and the element of over-all costs . . .*

**T**HERE are few things more frustrating than trying to find which fuse in the basement box of six blew when the lights in the living room went out. The urge—when you've tried four with no luck—is to pull the entire box off the wall and get six new fuses.

Translated into dollars, it is this same frustration that has caused the Air Force to adopt a kit system for repairing much of its equipment. In over-simplified terms, Air Force felt it would be less expensive in the long run to replace all minor equipment items—on the basis of wear-out probabilities—than to check each part each time a major assembly came up for overhaul.

The repair kit is defined by Air Force as a package of maintenance and overhaul parts bought and stock-listed as a single line item, regardless of property class (Hi-Valu, Category II, etc.). The individual parts usually have low unit cost and high replacement rates in the major assembly they serve. The kits are used in Category I and II recoverable assemblies, and may be bought for new assemblies or in-service items, depending on program life.

In putting together repair kits, Air Force has adopted a system which is generally dictated by common sense. They have said the kits should include (1) parts with a unit cost under \$1, (2) parts costing between \$1 and \$2, expected to be replaced 35% of the times that the major assembly cycles through repair, and (3) other non-repairable parts or sub-assemblies with a replacement rate of 80% or more. Air Force realizes that additional parts, beyond those in the kits, are often needed in overhaul. In this group are high-cost parts with a replacement rate under 80%, oversized parts, and some cure-dated parts.

Also included in the kits are parts that are normally base purchased. Repair kit parts are often stocked and issued separately, and if an item to be repaired has duplicate parts, the repair

kit will contain a corresponding number. Kit changes resulting from design changes are dictated by extent of the change and cost of the parts in question. The kit can be junked altogether if the kit itself does not represent an extravagant dollar investment.

The three step decision process for buying repair kits is this: (1) It must be decided if it is economical to repair the item in the first place, (2) it must be ascertained whether the item in question will adapt to the kit system, and (3) The appropriate repair level for which kits are to be bought is determined. The rule-of-thumb for kit costs is 65% of the end item cost. Purchases are initiated at Hi-Valu pre-provisioning meetings or during prime depot review of production lists.

Before prime depots buy repair kits, they must be sure that the item Provisioning Parts Breakdown (PPB) has been requested. They must also be careful in selecting the correct range of parts for each kit, and apply all available technical knowledge. Kit buyers are also told not to wait until the Provisioning conference to decide to buy the kits. This wait could result in months of delay.

If an item whose major assemblies are prime at two or more depots is considered, each Prime Air Materiel Area will provision kits for its own components. By a reviewing process, it is possible to apply the kit concept to items already in service. In this case, on-hand parts (if not cure-dated) may be returned to the manufacturer, to be included in the kits.

Air Force repair kits are stocklisted in the same category as the item that they service—kits for Hi-Valu items are tagged Hi-Valu. The kits are also categorized by the repair level at which they are used. The three groups are F, D, and C—Field level, Depot level, and kits containing cure-dated items.

The kit system was originally developed to overcome shortages of bits

and pieces associated with repair and overhaul. By-products of the program include reduced costs in buying, stock-listing, accounting, warehousing of small parts and fewer difficulties in controlling, on a line-item basis, small internal parts needed for repair work.

Program advantages have been numerous. The kit plan has deleted thousands of items from Supply Catalogs and Depot Materiel Standards, and has reduced individual line-item requisitions and followups, prevented production line stoppages, reduced individual line-item follow-on procurements and reduced time given to production scheduling, receipt, storage and issue of repair items.

Used in connection with Hi-Valu repairs, the kits speed operations, reduce actual repair time, and cut man-hours and machine time used in maintaining line-item consumption factors. Finally, the repair kit, as a single item, is more adaptable for direct shipment from source to user than many individual repair parts.

In computing the dollar advantage of the kit system, Air Materiel Command has found itself way ahead. While the initial kit cost is actually about 20% higher than for the individual parts, the difference is more than offset when single item costs for procurement, stock-listing, receiving, inventory, accounting, storing, scheduling, issuing, clearing, assembling and inspecting are taken into account.

It is probably because of these dollar savings that Navy's Bureau of Aeronautics has started work on their own kit program, and is working on a system of kit interchangeability with the Air Force. Because the dollar savings are substantial, and because the kits can be used on any piece of equipment that ever needs to be repaired, the idea is catching, and will probably find applications throughout the services, where ever improved management is a goal.



*In these days of "The Organization Man," the individual is too frequently over-looked. This is not necessary—and Army's smallest Ordnance Lab proves it with concrete results . . .*



## Diamond Ordnance

### Fuze Labs . . .

## Where Butterfly Chasing Pays Off

**"I**N THESE days of very large technical programs, requiring extensive team effort, the questions are often asked, 'What happens to the individual? Is the opportunity for the individual at odds with the Team concept?'

This is the first paragraph of a philosophy, belonging to Diamond Ordnance Fuze Laboratories, a small (this year's budget was \$28 million) complex of laboratories run by the Army in suburban Washington, D.C. While DOFL (rhymes with "waffle") is the smallest laboratory set-up run by the Army Ordnance Corps, it is presently responsible for roughly one-third of the annual Ordnance Corps patent output. The reason for this is perhaps contained in DOFL's answer to the question in the first paragraph of their philosophy:

"DOFL believes that it is not; that major progress is achievable only through concepts and inventions of single minds; that the products of a number of these minds are mutually stimulating and supporting; and that it is possible to merge these minds into a harmonious working team and still preserve individual opportunity and recognition. We at DOFL are not bound to tight little compartments. We grow and develop according to our abilities.

"We believe that DOFL can grow technically only as the members of the DOFL staff grow as individuals, and that the quality of the team effort reflects directly the quality of the individuals of the team."

How do you implement a philosophy

of this type? A major part of the answer to this is given by Mr. Wilbur S. Hinman, Technical Director at the Laboratories. Although the above philosophy is unsigned, it is known at DOFL that Mr. Hinman is the author.

Says Dr. Hinman: "If you get a good staff together, all you need is the right environment, with as few restrictions as possible. If you begin to regiment a scientist, he is, technically speaking, dead from the neck up. It is not hard for us to stimulate interest in the projects we get at DOFL. But on the other hand, we try to match jobs with personal interests here. There is hardly a problem that comes up around here but we have at least a fair to medium expert in the field. If a man is not interested in a project, we won't use him."

Echoing these ideas is DOFL Commanding Officer Lt. Col. John Ulrich. "You've got to have a climate to think. Restricted, the scientist is no damn good. If a guy gets an idea, you've got to have courage to let him play with it. You never know what will come out of it. You can make sure that he doesn't waste his time by keeping the air saturated with challenges which are more attractive than idle curiosity."

The reasoning behind this attitude is stated by Technical Director Hinman. Hinman points out that the scientist and the administrator are essentially different, and that this difference goes back to their early training. The administrator is trained to follow rules—the rules of administration. On the other hand, the scientist is bound

only by natural laws, and the surest way to gain scientific recognition is to break or rewrite one of these laws. By recognizing this difference, and by giving the scientist his head, to follow his own way—but holding him always responsible for his work—DOFL has become one of the most productive, and at the same time one of the most promising, labs in the Army system.

DOFL patent attorneys (a staff of three, which on occasion has processed patents in as little as 48 hours) receive annually some 80 invention disclosures, with an additional 20 from DOFL contractors. Of these, from 30 to 60 each year are filed with the U.S. Patent Office. As of the end of June this year, roughly 164 DOFL patent applications were pending before USPO.

In DOFL's five year history (the birthday was celebrated in late September, 1958) a total of 123 scientific and technical papers have been published by DOFL staffers. During the same time, 265 DOFL employees have made 370 public addresses and major technical reports.

In the much publicized guided missile field, DOFL can boast of having built the first efficient guided missile radio fuze, and today, most of the U.S. guided missiles incorporate fuze and other mechanical, electrical and electronic components which were designed at Diamond Ordnance Fuze Laboratories.

In working with engineering problems resulting from the wide environmental extremes in supersonic weapon systems, DOFL scientists have

discovered new materials and new production techniques which have both served the military, and had added benefits for the civilian economy.

It is interesting to quote top DOFL officials regarding their management policies, as they apply to the DOFL scientists, who number roughly two-to-one over administrative personnel at the Army laboratories.

According to Lt. Col. Ulrich, "We emphasize the job, but don't dictate the way it's done. There is no management tool to measure scientific competence. We must resist bureaucratic control. It's the paper-pushing that gives us trouble, and we've got to learn to avoid it."

"The way to manage red tape," says DOFL Technical Director Wilbur Hinman, "is to get administrators who understand engineering. We must keep this red tape away from the engineers here. The job of our administrators is to find how to fill the needs of the technical installation."

In charge of the administrative end of DOFL operations is H. W. Sisco: "We feel that the less management restricts in an R&D organization, the better the management is. There is quite an art to technical administration. A certain amount of butterfly chasing pays off handsomely, in any laboratory, but laboratory managers have to know when to call a halt."

The task of the scientific manager, DOFL officials feel, is in three parts: (1) they must give the job to scientists, (2) provide him with all of the material he needs to do the job, and (3) hold him—the scientist—accountable for the results.

Specifically, the DOFL managerial objectives are: (1) Assure a dynamic program of challenging tasks for the use and further development of creative potential; (2) Assure continued provision of resources needed; (3) Assure recognition (internal and public) of the professional achievements of the staff; (4) Assure that the customer gets the best results for his dollars; (5) Reduce the distractions that divert scientists "brain hours" into nontechnical activities, and (6) Constantly search for better ways to manage research and development installations.

Another reason for the high morale and achievement level at Diamond Ordnance is what DOFL officials call one of the best staff development systems in all of the Washington-area government agencies. Under this program, DOFL pays up to 75% of employee's tuition at local universities for courses in areas applicable to their work. In addition, DOFL grants those who are attending school up to four hours a week paid leave to attend their classes.

Equally important are the in-house seminars which DOFL runs "almost perpetually." It often happens that several employees will want the same outside class. And so instead of paying tuition for all those who want the class, DOFL has found it economical to import top specialists to conduct classes on DOFL grounds.

Subjects treated in the Seminars have included Inertial Navigation, Control System Syntheses, Digital Techniques and Molecular Engineering.

Diamond Ordnance also conducts an intensive summer student training program, in which high school and college students and science instructors come into DOFL on a part time basis during the summer. Described by Sisco as a "mutual evaluation" system, the summer student training program is DOFL's "best method of recruitment. With this program, we feel we are doing much to beat the rap of government industry pay scale differences." At the present, DOFL has two to three times more applicants than it can handle under this program.

About 32% of DOFL's professional employees are taking part in the DOFL Graduate Study Plan. In the Under Graduate Study, about 15% of DOFL's non-professional people are enrolled.

The primary job at Diamond Ordnance Fuze Laboratories is, as the name indicates, to work with proximity fuzes. But because of the unique skills of the scientists there, their work has come to include an entire galaxy of related projects.

First, DOFL conducts research and development projects in the various physical sciences and engineering fields for the purpose of meeting the demands by the military for modern fuzes and other electronic and mechanical systems. DOFL provides consultation and liaison services in connection with its research and development programs and production and use of items developed in its laboratories.

Also, it builds models and prototypes of hardware under development, and conducts laboratory and field tests with models and prototypes during the successive phases of research and development and production engineering projects. DOFL performs the Industrial Engineering Support Mission set up to insure most efficient procurement and production operations for proximity fuzes. It develops and directs the U.S. Army Regional Training Center for Executives with due emphasis on managerial problems unique to research and development.

Finally, DOFL establishes and maintains within its mission a coordinating

group for a research and test program on effects of nuclear environment upon ordnance electronic material.

For a staff of only 1400, this is a huge order. Because electronic ordnance is still unique, DOFL tries to keep roughly a 50-50 ratio of in-house and contracted projects. Here again, the DOFL philosophy rates attention.

As phrased by Administrative Director Sisco, it is this: "We make it a point to have our contractors work with us, not for us. We try to treat them as an extension of DOFL itself. You can't keep competent people unless they have real and challenging scientific work to do." Needless to say, this sort of a philosophy is not applicable in all cases. But on the other hand, the results at DOFL are a tough argument to crack.

On most of its in-house projects, DOFL is essentially self-sufficient. In addition to its own laboratories, DOFL has its own model shop for building models and prototypes, and its own test facilities at Blossom Point Maryland. But because of its scope, DOFL must use the extensive facilities of such organizations as White Sands Missile Range, Atomic Energy Commission, Redstone Arsenal and Aberdeen Proving Ground.

Within DOFL itself are three development labs, an advanced research lab, a systems research lab, a components lab, an industrial division, a technical services division and an administrative division.

Some of the most interesting—and most valuable—projects that DOFL has handled fall in the category of "butterfly chasing."

DOFL picked up the first National Micro-Miniaturization Award for its work in this field. In this competition, sponsored by the Miniature Precision Bearing Co., DOFL was competing with both industry and other government agencies. The winning entry from DOFL is now patented.

On a strictly off-beat assignment, a present DOFL staffer scored another high scientific advance. Working on the side for Georgetown University to develop a method for measuring blood flow in human arteries, DOFL developed an ultrasonic flowmeter which will be used in measuring the main coolant flow in U.S. atomic submarines.

Diamond Ordnance Fuze Laboratories' success cannot be argued—the system works. The reason for this success would seem to be summed up by the attitude of the people who work there. On DOFL commander Lt. Col. Ulrich's desk there is a turtle, made out of a shell and pipe cleaners. On the shell is written: "Behold the turtle—he makes progress only when he sticks his neck out."



# Newsletter

Armed Forces Management Association  
Room 3D937, The Pentagon, Washington 25, D.C.  
Phone: OTis 4-7193

National President: Rawlings S. Poole

Executive Director: VAdm. Harry E. Sears, USN, ret.

*AFMA Newsletter is issued monthly by the Armed Forces Management Association through the cooperation of Armed Forces Management magazine to inform the membership and AFM subscribers of the aims, projected programs, and current activities of the Association.*

Progress of AFMA expanded program, now three months underway, continues at an accelerated pace. Reactions from all sources most encouraging and a fine stimulus for the Directorship at National Headquarters. A multitude of details still to be worked out but starts have been made in the many areas of program desiderata described in last month's issue of the **Newsletter**.

Cooperation of Office of Secretary of Defense, Service chiefs, and installed commanders has been of the finest. Assistance of Chapters, especially in matters involving administration, generation of sound chapter programs and forwarding of beneficial suggestions likewise inspiring and appreciated. Sound management is an all hands job.

More and more people are becoming interested in AFMA, its dedication to good management in the Department of Defense, what it offers the individual member and how it benefits industry (and indirectly thereby, defense), thus insuring an essential foundation for AFMA efforts.

Mere awareness of management and what it connotes, and interest in its betterment by the Services at large will complete the framework of the AFMA goal of "Better Management Means Better Defense."

Review of AFMA Program, outlined last month under functional areas of Plans, Programs, Chapter Services, National Conference, Publications; and ancillary activities of Public Relations and Legal reveal following developments:

**Plans and Programs.** Project for the formation of an Industry Advisory Council, composed of top flight management executives from industry, now out of the plans stage and into programing. Letters have been dispatched to presidents of first twelve corporations affiliating with AFMA asking each to appoint a council representative. This council, and company representatives associated with chapters in the field, will provide an exchange of management knowledge between defense and industry, a prime AFMA objective.

A similar Council recruited from Educational Institutions, designed for a similar purpose—to tap the management knowledge of education and to provide an exchange of management knowledge between defense and education, still in the planning stage. Potentialities of these two projects almost unlimited and highly promising.

**Chapter Services.** Vice President for Chapter Services and staff have recently completed chapter administration section of chapter manual and forwarded to all chapters with a supply of necessary forms. This should greatly simplify administration and booking at the chapter level.

Copies of outstanding chapter programs will continue to be distributed as received. Look for one such from Atlanta General Depot Chapter this month. Large size AFMA seals in color, suitable for framing and display at chapter meetings and for publicity purposes, will soon be mailed to all chapters.

**Publications.** Flow of material for inclusion in AFM magazine and AFMA Journal is increasing and covering ever wider areas in the management field. While presenting something of a problem to the editors concerned, they like it this way! Keep the material coming. These media constitute one of the principal means for the exchange of management knowledge—a prime AFMA objective.

**National Conference.** Now out of the planning and into the programing stage. Response from industry co-sponsors and exhibitors continues excellent. Priority of space location, as in past, being given to Corporate Members.

**Public Relations, Promotion, Publicity.** DOD and Services have assisted greatly in informing defense establishment about AFMA what it is, what its objectives are and the services it renders.

A reception honoring new corporate members held recently in Washington. Receiving framed certificates for their companies were representatives of Aerojet-General, Bell Aircraft, WheelDEX & Simpla, Soundcriber Sales, Chance Vought Aircraft, Thomas A. Edison Industries, Diebold Corporation, North American Aviation, and Aerodynamic Systems subsidiary of Ford Motor Company. Present were top officials of AFMA, representative from companies already affiliated with AFMA, and prospective corporate membership invitees.

## Chapter Briefs:

Requests to form new chapters have been received from St. Louis, Philadelphia and Westover A.F.B., bringing to seven the backlog of these requests. With increase of aviation and electronic industry in AFMA program, steps being initiated to form a new chapter in the Los Angeles metropolitan area.

Mohawk Chapter recently welcomed to its membership MGen Clyde H. Mitchell, U.S.A.F., Commander Rome Air Material Area AMC. Atlanta Chapter has as a member active in its affairs, BGen Oliver C. Hardy, U.S.A., Depot Commander, who introduced Congressman James C. Davis as the principal speaker at a recent luncheon meeting.

New York Chapter is going into its own expanded program. Potentially our largest, it will soon include members from all military installations in the metropolitan area, if present plans materialize.

The importance of multi-service participation in local chapter activities cannot be overemphasized, if a principal AFMA objective of exchange of management knowledge among the elements of the DOD is to be realized. Include Industry representatives to complete the picture.

**Administrative notes** "Position" title inadvertently left off of new member application forms recently forwarded to all chapters. Make change locally. Must have Rank/GS grade and Position for delivery of AFM magazine. Subscription rate now \$10.00 but still included in \$6.00 membership fee at no extra charge, along with AFMA Journal, a \$13.50 bargain for \$6.00—a good membership selling point.

## Every Member Get a Member—or Several

(For further information on individual or corporate membership in the Association, circle number 200 on the business reply card on p. 49 or write AFMA direct.)



## National Capitol Chapter

Retired Vice Admiral Harry E. Sears, AFMA executive director, was guest speaker at a recent meeting of the National Capitol chapter in the U.S. Naval Gun Factory in Washington.

Chapter President Tom Kouzes reports 78 members and their guests were present at the dinner meeting, first one held under jurisdiction of the 1959 slate of chapter officers: Lt. Col. Grace M. Barth (WAF), vice president for administration; Claude A. Alsop, vice president for membership; John Polansky, Jr., executive secretary; Marie J. Muir, treasurer.

During his speech, Sears outlined the AFMA future as he saw it. His remarks on the "New Horizons for the Armed Forces Management Association" should provide a valuable guide and inspiration to AFMA members world-wide. He said, in part:

When I assumed my duties a few weeks ago as the Association's first full-time executive director, I did so principally for two reasons:

One—the tremendous potential which exists in the organization to render outstanding service to our country in the areas of defense, industry and education; and

Two—the great challenge which the job offered in the pursuit of our worth aims and objectives.

I have not been disappointed. The more I get into the operation, the more I am impressed with the untold opportunities which exist for AFMA to serve, with the high quality of the people who comprise AFMA, and with what membership in the Armed Forces Management Association has to offer, particularly as our program unfolds.

What is AFMA and what are its aims and objectives?

We all know that AFMA is an organization of civilian and military executives of the Department of Defense, with associates in industry and education devoted to the improvement of management throughout the armed forces, in order that more efficiency and economy in the use of our military resources may be realized. We know that AFMA provides a means for the exchange of management knowledge among the various elements of the defense establishment, and between industry, education and the defense establishment. Lastly, we know that it provides its members the opportunity to participate with people of like experience and interest in achieving these objectives.

These are good, solid objectives and they are most commendable. And most important, they have the solid back-

ing of the Secretary of Defense and the top management of the Services.

However, without a good program and a means of executing it effectually, the best motives and the best support in the world are rather meaningless. It is our new AFMA program and its execution which comprise the meat of my remarks here.

Within the guidelines established by our national president, and through the organization which he has developed, we have come up with what we feel is a solid program in keeping with our objectives and the support we have received. I will not go into detail about this other than to say that it involves among other things, better services to the chapters and the membership in general, a close liaison with industry and educational institutions for the exchange of management knowledge and machinery within the organization for practical problem solving and professional development.

We freely admit that the program, which is nearing finalization, is ambitious but believe it is well within the capabilities of our organization, once it has been built up to the size we feel it should be. This brings me to the concluding and most important part of my remarks—what we are doing now to develop AFMA, and what YOU CAN DO to help us.

1. *Corporate membership drive.* The response in obtaining industry members into our chapters is encouraging. Corporate memberships have increased 200% in the past six weeks. You can

be a great assistance in this area by explaining in your contacts with company representatives, the advantages of membership in AFMA.

2. *Individual membership drive.* We are just swinging into an accelerated drive—one in which you can help. Every member get a member.

3. *Chapter Expansion.* Although some groundwork has been laid, it is our intention to contact every major installation in all of the services. Our goal for the fiscal year is to double the membership and double the number of chapters.

4. *Other items of interest to you.* Public relations, publicity, the AFMA Journal, advertising and streamlined administrative practices have been modernized and much progress has been made in all these vital fields.

In conclusion, analysis of AFMA is that it is a fine, solid organization, with tremendous potentialities for rendering unique services to defense, industry and education. It has made a considerable contribution in the past—and I salute the devoted people who made it so. It can make a far greater one in the future. It has got to be publicized, its operations have to be expanded and its membership built up. You can help in these. From these will come improved service—conferences, seminars, workshops, and education of the individual members.

This won't be accomplished in a month or a year. But the day will come when AFMA will be a good-sized, thriving, serviceable organization. The possibilities for our fine organization are almost limitless. The sky is the limit—and that is what is on the horizon for AFMA.



At a late-November meeting, AFMA presented corporate membership certificates to (shown above, left to right) S. G. McLennan, Bell Aircraft Corp.; J. C. Borrer, Diebold, Inc.; E. R. Virgin, North American Aviation; Frances Warren, Wheelindex & Simpla Products, Inc.; John B. Allyn, Chance Vought Aircraft, Inc.; Thomas A. Callaghan, Jr., eastern representative, Aeronutronic Systems, Inc.; with AFMA Executive Director Sears; J. D. Gilerist, Aerojet-General Corp.; Walter Aylsworth, Thomas A. Edison Industries; and James E. Murphy, Soundsciber Sales Corp., each of whom represented their firms at the presentation. (For more on AFMA corporate members, number of which has jumped 200% since drive started two months ago, see Newsletter on preceding page.)

# The Driverless Tug: A New Twist in Material Handling

**L** I'L ABNER'S famed witch, Nightmare Alice, may have cavorted across the sky on her broomstick during Halloween, but it's a cinch she wasn't riding the new tug in Dayton Air Force Depot's Maintenance directorate. Nobody was.

Patently straddling a four-inch yellow line that would tax any reveler in a sobriety test, the tiny tug pulls its three carts without the aid of a driver. Called Guide-O-Matic by its manufacturers, the Barrett-Cravens Co., the driverless tug is the first in the Air Materiel Command to be used in a shop.

Five of its brothers, a year older and with an evident yen for the outdoors, went to work for AMC at San Antonio Air Materiel Area pulling carts from building to building. But Dayton Air Force Depot's tug is the first to be used in the crowded confines of a busy shop, and, says DAFD, the tug is only the second of its kind in use in Ohio.

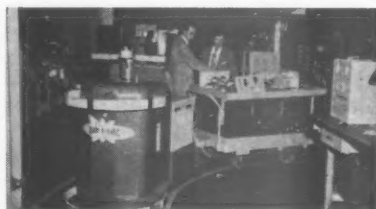
Need for increased production prompted the investigation into Guide-O-Matic's possibilities. Installation of the system involved such things as painting a yellow track for the tug to follow, and painting arrows on the shop floor showing the tug's direction of travel. In addition, a groove,  $\frac{1}{8}$ " wide and  $\frac{3}{4}$ " deep, was cut throughout the Maintenance shop floor. Into the groove went a copper wire to guide the tug.

Guide-O-Matic runs its course by means of a sensing device in the tug. It picks up the seven kilocycle signal that runs through the guide wire and follows the wire. There is no contact between the sensing device and the wire.

Complete circuit is 1800 ft. long. The tug operates at about two miles per hour, slightly less than average walking speed. It will make 32 stops and can be programmed in two ways.

A dispatcher in the staging area to the rear of the shops will do the primary programming. He receives requisitions for end items and bits and pieces. He loads the material on double-decked carts flips the toggle switch on the tug's control box and sends the tug to the bench indicated by the switch.

Men at the work benches can also



Rounding a curve at slightly less than two miles per hour, the driverless tug lets two DAFD employees examine equipment on one of its three double-deck carts.

program the tug. If they have repaired material or requisitions ready to go on the tug, they throw a switch at their bench. This causes the tug to stop there on its rounds.

There are 27 scheduled stops among the 80 benches in the shops. Four doors in Maintenance present no problem to the tug. Doors to the paint shop and from the Maintenance Operating Stop (MOS) are set to open automatically as soon as the tug approaches.

If for some reason the door fails to open, a warning device brings the tug to a halt. And there it sits until someone opens the door and hits the start button.

Economy and efficiency also played parts in getting Guide-O-Matic to the Depot. Valuable time was wasted while skilled repairmen left their benches to get reparable equipment and bits and pieces. Now production can continue smoothly via the "messenger boy" service supplied by Guide-O-Matic.

At special stops, such as the paint shop and MOS, the tug stops, waits 15 seconds and then, if no one comes to service it, blows a klaxon horn intermittently for one minute. If still untended, the tug glides off silently. This steady flow of parts and equipment cost the Depot \$23,866, completely installed. The tug can be modified to include more stops. Physical limitations are the only boundaries to expanding its capabilities.

Safety has been thought of in its manufacture. Two flexible steel bumpers, 2" and 3' 8" from the floor, stop the tug when depressed  $\frac{3}{4}$ ".

As eerie as the little tug appears as it wends its driverless way, it seems that perhaps Nightmare Alice has given up black magic and become an Air Force tug driver.

## Dates to Circle

### December 3-5

Eastern Joint Computer Conference—Philadelphia, Pa.

### December 16

Fourth Convertible Aircraft Congress—Franklin Institute, Phila.

### December 16-17

The Aircraft Service Association annual meeting—Washington, D.C.

### January 12-14, 1959

Fifth National Symposium on Reliability and Quality Control—Philadelphia, Pa.

### January 12-16

Society of Automotive Engineers annual meeting and engineering display—Sheraton-Cadillac and Hotel Statler, Detroit.

### January 28-29

Nuclear Fuel Elements symposium—Columbia University; sponsored by Columbia University and the Sylvania-Corning Nuclear Corp.

### February 3-5

Fourteenth Annual Technical and Management Conference—Chicago, Ill.; sponsored by Reinforced Plastics div. of the Society of the Plastics Industry, Inc.

### March 3-5

Western Joint Computer Conference—Fairmont Hotel, San Francisco, Calif.

### March 16-20

Eleventh Western Metals Exposition and Congress—Pan Pacific Auditorium and Ambassador Hotel, Los Angeles; sponsored by American Society of Metals.

### March 19-20

Flight Propulsion Meeting (classified), Institute of Aeronautical Sciences—Hotel Carter, Cleveland.

### March 31-April 3

Society of Automotive Engineers, National Aeronautic Meeting, Aeronautic production forum and aircraft engineering display, New York.

### April 6-7

Third annual Astronautics Symposium, Air Force Office of Scientific Research, Sheraton-Park Hotel, Washington, D.C.

ARMED FORCES MANAGEMENT

# Your Investment Future

## MANAGEMENT—The Heart of a Mutual Fund

by W. Mac Stewart\*

Financial Editor

ON the day you read this—and every business day—over 1,000 more men and women are entrusting their savings to a mutual fund to invest and “manage” for them. They are joining the more than 3,000,000 mutual fund investors who are depending upon professional management to help meet their future financial needs. Just what is this “management” provided by mutual funds? How does it work? Who does it?

With few exceptions, a mutual fund does not perform its own management; it obtains management and other services from a management corporation, by contract. In most cases this management corporation also provides for sale of the fund's shares, handles legal matters for the fund, provides accounting services, and handles the investment of capital of the fund. Thus the management corporation is the “brain,” while the assets of the fund are the “body” of the fund corporation.

Let's see just how a typical management corporation handles the dollars entrusted to a fund by some of those three million average investors. Usually, this management function is carried out by a separate department of the company, often known as the “Investment Research” department. This department is staffed by security analysts, assisted by a staff of economic, clerical, and statistical personnel. Some companies also employ various market analysts and technicians.

The function of this department is to determine the “what” and “when” of securities purchases and sales. To do this, the Research Department must continually search the market for new issues

First, the earning power and dividend record of the company must be studied in minute detail. Then the company's financial position is studied from every angle, including amount of working capital and capital for long-term development. Amount of bonded indebtedness and the existence of senior securities are a factor here, too. Competition must be studied: The analysts consider the company's relationship to other companies in sales, profit margins, trend of product demand, and other competitive factors. Product quality, price, and diversification are analyzed.

\*Vice President—Research.  
Hamilton Management Corporation

No company is better than its management, so the background of the executives is studied . . . as well as the company's organizational structure and its record of labor and stockholder relations. Another important factor is the company's research and development policies and activities. And finally, the stock itself—whether it is currently underpriced or over priced, and the price trend.

These are just a few of the many factors that must be considered in selecting a stock. There are many others. Almost every major news event has an immediate or long range effect on the stock market and on industries or companies. Auto, steel, and construction activities are closely watched. Federal legislation, tax laws, and Federal Reserve Board activities can have far reaching effects. Strikes, inventory levels, new inventions, all play a part. Mix in the international situation, and you can see the enormous amount of research that must go into the selection of each individual security—and the reason why only the most wealthy investors can afford such investment advisory service for their own portfolios.

Once a decision to purchase a stock has been made, the big question becomes WHEN . . . as well as *how much* to buy. It might be bought immediately, or it might be weeks or months before that particular issue is purchased in the quantity desired. And once that stock has been added to the portfolio, it receives constant scrutiny to be sure that it remains as healthy and strong as when it was added to the fund's assets. Stocks are sold from the portfolio when research indicates that some of the factors that influenced purchase no longer exist, or may weaken in the future. And, in many cases, such stocks are sold at a profit long before the average small investor realizes that the stock may become depressed or fail to keep up its earnings or growth record.

Although each investment fund operates in a slightly different manner, each of them tries to protect investors' capital and give it earnings or growth—depending upon the fund's objectives—by applying the three basic investment principles of SELECTION . . . DIVERSIFICATION . . . and SUPERVISION. Expenditures for this management run to many thousands of dollars. But by spreading the cost among thousands of investors it becomes a negligible expense to each in-

vestor. Yet each investor receives the advantages of professional management that he could not afford as an individual. You can easily see why most common stock mutual funds have consistently paid dividends, quarter after quarter, through good times and bad.

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# Looking Ahead...

## The Challenge To Technical

## Publication Management\*

Tenth of a Series

by Roswell Ward  
Technical Publication  
Management Consultant,  
Bantam, Conn.

IT is not possible in the present preliminary stages of the development of "publication management engineering" to present a broad, well documented, or statistical analysis of the current status of technical publication work. In the absence of much published material, except for an increasing literature devoted to technical writing and editing, there is not much to go on except personal experience made meaningful by a wide variety of contacts with technical publication and technical information service activities.

There are two levels of management involved in publication work in industry, government, and research organizations—top management and publication management. The ability of executives at these levels, judged both by general management standards and by publication management standards is the controlling influence in meeting the following objective of our technical publication efforts:

### Long Term Objectives

1. The collection, interpretation, and dissemination of all technical information needed by armed forces personnel to insure a high level of combat readiness in their ability to operate and maintain all types of weapons systems and military hardware and to understand and carry out prescribed tactical and strategic missions in accordance with their assigned responsibility.

2. The provision of well planned and adequate information and instruction on the operation, maintenance, repair and overhaul of industrial, business and commercial, and consumer and homeowner equipment and appliances. This includes a wider distribution of maintenance, repair, and over-

haul manuals to equipment users who definitely have a "right to know" about all aspects of equipment which they purchase and which they may wish to maintain themselves.

3. The collection, interpretation, and dissemination of all types of technical information and news on products and production; organization resources and development, past, present, and future; and long-term plans. In many cases "management information" and outlines of management resources and policies may be closely related to technical information service as defined above.

### Instruction Books

The objectives of military technical publications of all types should constantly emphasize, probably more than they do at the present time, that an instruction book on military equipment is not part of the machine. It is, or it should be, part of the man who is to have command responsibility, operating responsibility, and maintenance responsibility for weapons systems or equipment used in support of combat operations and our national peacetime policy of split-second combat readiness.

Pre-World War II informal reports indicated, even at that time, that the USSR armed forces used instruction books on widely used military hardware which were published in five different editions, each edition keyed to (1) the command responsibility (2) the technical knowledge (3) the degree of literacy of the men directing, using, or maintaining the weapons described. No official data is available at present but it is widely believed that some of the best writers and artists in the USSR are working on military instruction books.

Of the nine articles published in this series so far it is significant that

the widest interest—military, governmental, industrial, and educational—has been expressed in regard to the article (ARMED FORCES MANAGEMENT, August, 1958) on Unified Technical Information Services. Some organizations have begun management studies to determine whether they should adopt the "U.T.I." plan. Reports have been received that other organizations, as an interim measure, have ruled that no advertising copy or press releases, or any other type of internal or external communication that has group circulation or mass circulation in technical or popular fields, can be issued without engineering department approval of factual information (this implies no veto power in the editorial or creative sense).

It is a recognition that technological facts underly much of the news, sales promotion material, stockholders reports, and all of the other wide variety of information disseminated by industry, government, and educational institutions. This in no sense detracts from the skills and responsibilities of competent advertising, public relations, employee information, and sales promotion specialists; many of whom have voluntarily "checked copy with the chief engineer" as a long-established rule of procedure.

### The "Right To Know"

Partly as a result of increasing familiarity with new mechanical, hydraulic, and electronic systems (often acquired by service in the armed forces); partly as an expression of the "do-it-yourself" trend in maintenance and repair, in industry as well as among homeowners; and partly as a result of poor service and repair facilities maintained by some equipment dealers (or high prices charged by these dealers), there is an increasing demand for manufacturers to make

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available to purchasers of equipment of any type *all of the information* needed for maintenance, repair, and supply of spare or replacement parts. The service and repair "informational monopoly" is definitely on the way out and industrial instruction book departments will have to consider the needs of the "user audience" much more than they have in the past. Recent reports received by the writer indicate that much of the "repair it yourself"—"we have a right to know everything about equipment we purchase"—trend, show the most activity in automotive, construction equipment, private flying, and home appliance industries. The FTC is said to be examining this problem and CAA is said to have considered intervening with aircraft and engine manufacturers on behalf of private or business flyers who are qualified to deal with their own maintenance problems.

## Other Problems

To an increasing degree, defense contractor's publication managers and top executives who understand their problems are demanding some concerted effort to obtain a simplification and "unification" of the over 200 armed forces specifications now in force. The rigidity of these specifications, the needless variations between services (for example on specs concerning electronic equipment) and the routine and inexpert use of the specifications as a method of determining compliance with equipment contracts all take a heavy toll in money, time, and the quality of publications now produced.

In this respect, in a slightly different relationship, the "ATA 100" publication specifications of the Air Transport Association of America may serve as a model for concerted action by defense contractors. Over a period of years, the ATA has developed, in cooperation with airframe and aircraft engine manufacturers, a type of specification for instruction books which is keyed to the needs of the men who fly and maintain our commercial airline equipment.

One well-worked-out set of specifications outlines the entire range of maintenance manual needs of the American flag commercial airlines and, in the initial stages of development of

"ATA100" there is a high degree of flexibility in obtaining changes and modification recommended by ATA members, manufacturers, and subcontractors. If one set of specifications can guide the preparation of the "five foot bookshelf" of manuals needed for operation and maintenance of the Boeing 707, the Douglas DC8, and the new Convair jet transports, it certainly would seem logical that the armed forces could take a long look at the ATA example.

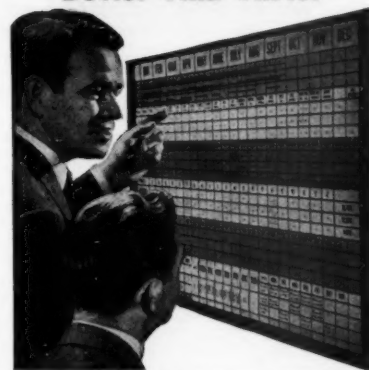
## It's Up To Management

The management executives mentioned in the first paragraph of this article are dealing with a complex technical communication problem requiring three types of skills: (1) Management ability of a type akin to that developed to encourage the creative spirit and alertness to innovation in present research and development activities; (2) Technical knowledge sufficient to administer a technical communication program. (3) Publication Skills: high level of proficiency in writer management, editorial supervision and leadership, team-work with graphic arts and other publication specialists and ability to maintain good and informed relationships on contract negotiations, contact with other departments and customers, and outside educational and professional contacts in the broad fields of technical publication and information activities.

If we are to develop our technical publications to a degree of usefulness comparable to the equipment and services they describe, we must not only have well qualified publication managers, but we must have middle management and top management executives who take the trouble to learn something about publication work—at least enough to know how well qualified their advisers may be in this field—and who are prepared to recognize how important technical publications are and will be to all branches of industry, government, and education, military and civilian. We have come a long way in publication work, but we can go a long way still—and save money, develop better manpower and professional standards, and make instruction books a vital, essential educational force rather than the dull, routine, perfunctory "dry-as-dust" devices they now are.

This concludes the series of ten articles on technical publication management problems which have been published in successive issues since March 1958. A collected edition of reprints of these articles will be available in January 1959. For information, address the author: Roswell Ward, Technical Publication Management Consultant, Rockledge, Bantam, Conn.

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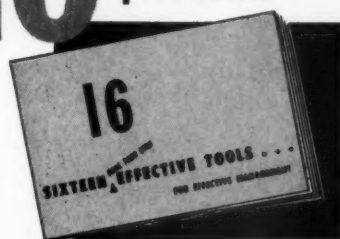
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## Personnel Preview

### Two ASW Defense Groups Are Set Up By Navy

Anti-submarine Defense Groups Bravo and Charlie have been formed by Navy under Commander-in-Chief, U. S. Atlantic Fleet. Mission of the two new groups will be to concentrate on specific antisubmarine warfare problems and tactics to improve anti-submarine warfare readiness in the Atlantic Fleet.

Group Bravo will work mostly with hunter/killer tactics, doctrine and equipment, while the major job of Group Charlie will be in the area of convoy escort operations.

Commanding Groups Charlie and Bravo will be RAdm. L. M. Mustin and RAdm. E. A. Hannegan, respectively.

### Missile Director Holaday Heads Space Liaison Group

Defense Department Guided Missile Director William Holaday has been named by the White House to head the civilian military liaison committee which will coordinate DOD work with that of the National Aeronautics and Space Agency.

Other DOD Representatives on the liaison group include Advanced Research Projects Agency Director Roy Johnson, Army Director of Special Weapons Maj. Gen. W. W. Dick, Navy DCNO/Air VAdm. R. B. Pirie, and Maj. Gen. R. P. Swofford, Assistant Chief of the Air Staff for Development.

Representing NASA on the committee will be Dr. Hugh L. Dryden, Deputy NASA Administrator, Dr. Abe Silverstein, Director of Space Development, Dr. Homer J. Stewart, Director of Program Planning and Evaluation, and Ira H. Abbott, Assistant Director for Aerodynamics and Flight Mechanics Research.

### Logistics Study Group Studies Work at AMC

A Military/Industry Logistics Data Development Unit (MILDDU) has convened at Headquarters, Air Materiel Command for two months of work and study. Prior to coming to AMC, the study group had worked with Navy's Aviation Supply Office.

Composed of representatives from industry and the three services, the group's purpose is to "exchange ideas on logistic data systems with an ultimate

goal of standardized systems of data exchange between industrial and military logistics activities."

In greeting the group, AMC's Director of Plans and Programs, Maj. Gen. F. A. Bogart, said that interchange of information between data processing systems of the services and industry is a key part of future logistic support work.

AMC expects that MILDDU will work most closely with the Data Systems Plans Division of the Directorate of Plans and programs. Ultimate goal of the group, said Gen. Bogart, should be a common language and a completely integrated data processing system.

### Dr. Charyk Appointed USAF Chief Scientist

Dr. Joseph V. Charyk, general manager of the Space Technology Division of Aeronutronics Systems, Inc., has been named to succeed Dr. George Valley as Air Force Chief Scientist. A subsidiary of Ford Motor Co., Aeronutronics maintains plants in California.

Dr. Charyk has worked with the fluid mechanics subcommittee of the

National Advisory Committee for Aeronautics, and has been a member of the Technical Advisory Committee on Aeronautics for the Assistant Secretary of Defense for Research and Engineering.

Dr. Charyk is presently a member of the Air Force Scientific Advisory Board, and chairman of the Air Force Committee on Aeronautics and Space Vehicles, which conducted a long-range planning study under the National Academy of Science.

### Communications Course Given for AF Students

Air Force personnel representing 12 Air Force Bases have completed an intensive six-week communications course conducted by Stromberg-Carlson Division of General Dynamics Corp.

Aim of the course was to familiarize the students with the circuits, installation and maintenance techniques used with the XY Dial central office equipment.

Attending the course were Air Force NCO's and civilian personnel with as much as ten years' service. After graduation, the men will operate and repair the Dial systems, install it or serve as instructors for future personnel.

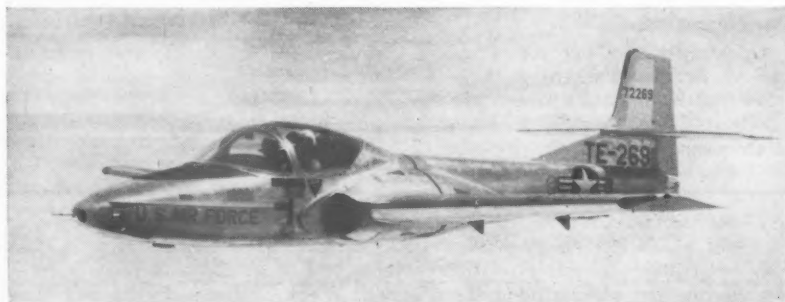
### All-Jet Training Set For AF Class

Air Training Command has announced plans to give 38 student pilots their first flight training in jet aircraft. Prior to this, all pilots had at least 30 hours of propeller time before graduating to the jets.

The class, which began on November 20, will serve as a test group, and is being compared with a similar group of pilots taking training the old way. The pilots will take initial flight training in Cessna T-37 twin-jet aircraft, and will fly from Bainbridge Air Base, Ga.

Commenting on the program, Col. James S. Edney, Director of Primary Pilot Training Division of the Air Force said "We hope to learn or prove many things from this test. Our First Concern is to determine the effectiveness of all jet primary training, using the T-37. Next, it will be a cost comparison between the two programs."

Aimed eventually at an all-jet Air Force, the program is expected to improve overall jet pilot proficiency and reduce the training time needed.



Cessna T-37 will be used as primary trainer for first AF pilots to receive all-jet flight training.



## Fleet Division Set Up By Navy's BuSanda

Establishment of a Fleet Operations Division of Navy's Bureau of Supplies and Account has been announced by BuSanda Chief RAdm. J. W. Boundy.

The new division was formed by merging functions and responsibilities formerly handled by several segments of the Bureau. Aim of the change is to increase supply management's ability to keep up with fleet operations and

rapidly developing weapons systems. Besides offering a single point of contact between the Bureau and the fleet, the new organization is expected to assist on streamlining communications, paperwork, and management procedures.

Commander W. W. Tolson has been named to head the Division, which will include a Fleet Logistic Information Center to collect and make available pertinent supply information and data.

## Shift in Key Personnel

### DEFENSE DEPARTMENT

Robert Huntington Knight appointed Assistant Secretary of Defense for International Security Affairs in Mid-November.

F. Haydn Williams appointed Deputy Assistant Secretary of Defense for International Security Affairs.

Mrs. Neal Tourtellotte to be chairman of the Defense Advisory Committee on Women in the Services (DACOWITS) effective 1 January.

### ARMY

Dr. John W. Dawson from director of the Chemical Sciences division to Chief Scientist, Office of Ordnance Research, Durham, N.C., to succeed Dr. George Glickler who has retired.

Brig. Gen. James W. Coutts from Commanding General, U.S. Army, Antilles, Fort Brooke, Puerto Rico, to Chief of Staff of the Caribbean Command, probably in December.

### NAVY

Rear Adm. Robert T. S. Keith from Cmdr., Naval Base, Subic Bay to Asst. Chief of Naval Operations for Naval Reserve, about February.

Rear Adm. Hugh C. Haynsworth, Jr., from Asst. Chief of the Bureau of Supplies and Accounts for Supply Management to Commanding Officer, Naval Supply Center, Norfolk, Va., about January.

Capt. Ralph C. Johnson (Rear Admiral selectee) from Commanding Officer, USS Columbus (CA-74) to Deputy Naval Inspector General.

Capt. Arthur F. Spring (Rear Admiral selectee) from Chief of Staff and Aide, Commander, Seventh Fleet, to Commander, Naval Base, Subic Bay.

Captain John B. Colwell (Rear Admiral selectee) from Commanding Officer, USS Galveston (CLG-3) to Office of the Chief of Naval Operations.

Rear Admiral Howard A. Yeager from Commander, Amphibious Group Four, to Office of the Chief of Naval Operations in December.

Rear Admiral Edward E. Colestock from Prospective Commander, Carrier Division 19, to Commander, Carrier Division 17.

Rear Admiral H. G. Rickover promoted to Vice Admiral in present duty as Assistant Chief for Nuclear Propulsion, Navy Bureau of Ships.

Rear Admiral John S. Davidson from Commander, Cruiser Division Five to Chief, Navy Group, Joint U.S. Military Mission for Aid to Turkey, Ankara, Turkey.

Rear Admiral William Dolan, Jr., from Asst. Chief of the Bureau of Ships for Shipbuilding and Fleet Maintenance to Asst. Chief for Technical Logistics.

### AIR FORCE

Maj. Gen. Sam W. Agee to Cmdr., 26th No. American Air Defense, Continental Air Defense, Syracuse, N.Y., AF station.

Brig. Gen. John M. Breit to Director, Special Investigation, Office, The Inspector General, HQ., USAF.

Brig. Gen. Austin J. Russell to 822 Air Div., Hq., 822nd Air Division, Strategic Air Command, Turner AFB, Ga.

Maj. Gen. J. S. Mills, Assistant Deputy Chief of Staff, Development; to commander, San Bernardino Air Materiel Area, Norton Air Force Base, Calif.

Maj. Gen. R. P. Swofford, Director of Research and Development, Hq., USAF; to Assistant Deputy Chief of Staff, Development.

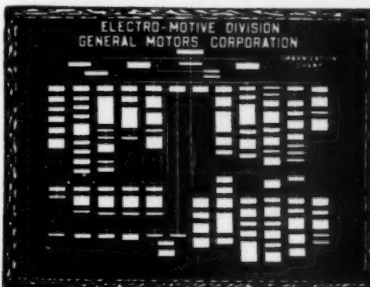
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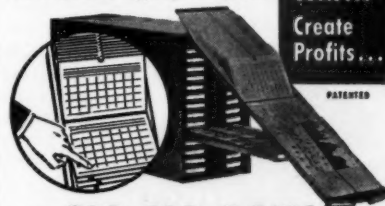
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Electronic Engineer (3) GS-11  
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Electronic Scientist GS-9	\$6285	pa
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Electronic Engineer (Radio) (2) GS-11	\$7510	pa
Nurse Anesthetist GS-9	\$5985	pa
Supv. Mechanical Engineer GS-11	\$7510	pa

### U.S. Army Engineer District, Omaha Corps of Engineers 1709 Jackson Street Omaha 2, Nebraska

Supvy Construction Engineer (General) GS-14  
Supvy General Engineer GS-13  
Civil Engineers GS-9, 11, and 12  
Mechanical Engineers GS-9, 11, and 12  
Electrical Engineer GS-12

Construction Engineers GS-11 and 12  
Construction Mgmt Engineer (Airfields) GS-12  
Materials Engineer GS-12  
Materials Engineer (Soils) GS-12  
Architect General GS-11  
Engineering Designer GS-11  
Construction Representative GS-9 and 11

### Industrial Relations Department U.S. Naval Torpedo Station Keyport, Washington

Physical Metallurgist GS-11  
Electronic Engineer GS-11  
Mechanical Engineer (Ordnance) GS-11

### U.S. Naval Avionics Facility, Indianapolis 18, Indiana.

Electronic Engineer GS-9  
Electronic Engineer GS-11  
Mechanical Engineer GS-9  
Mechanical Engineer GS-11  
Electrical Engineer GS-9  
Electrical Engineer GS-11  
Electronic Scientist GS-9  
Electronic Scientist GS-11  
Physicist GS-9  
Physicist GS-11  
General Engineer GS-11

### U.S. Coast Guard Headquarters Washington, D.C.

Supervisory General Engineer (Electrical, Mechanical, Acoustics, Optics) GS-14  
Electronics Engineer (Radio) GS-13  
Supervisory General Engineer (Electrical, Mechanical, Acoustics, Optics) GS-13  
Civil Engineer GS-12  
Aeronautical Engineer GS-12  
Construction Management Engineer (Gen.) GS-12  
Physicist (Optics) GS-12  
Naval Architect GS-11  
Structural Engineer (Floating Structures) GS-11  
Electrical Engineer (Marine) GS-11  
General Engineer (Marine Equipment) GS-11  
Electrical Engineer (General) GS-11  
Mechanical Engineer GS-11

Civil Engineer GS-11  
Mechanical Engineer (General) GS-11  
General Engineer (Marine Equipment) GS-9

### 1st Coast Guard District

Boston, Massachusetts  
Civil Engineer GS-9  
Electrical Engineer GS-9

### 2nd Coast Guard District St. Louis, Missouri

Electronics Engineer (Radio) GS-9  
Engineering Designer GS-9

### 3rd Coast Guard District New York, New York

Mechanical Engineer GS-11 or GS-9  
Civil Engineer GS-11  
Civil Engineer GS-9

### 5th Coast Guard District Norfolk, Virginia

Electrical Engineer GS-11  
Electronics Engineer (Radio) GS-9

### 7th Coast Guard District Miami, Florida

Electrical Engineer GS-11

### 8th Coast Guard District New Orleans, Louisiana

Civil Engineer GS-9

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ARMED FORCES MANAGEMENT

## Research and Development

### NASA Will Contract Under Standard ASPRs

The National Aeronautics and Space Agency will use Armed Services Procurement Regulations as a basis for new contract procedures which are currently under development. NASA will have major procurement and contracting programs in connection with its space flight and exploration activities.

According to Administrator Keith Glennan, contractors should welcome this plan. "They will not be required to learn how to operate under widely divergent NASA, nor will this change procedures for those contractors now engaged in projects which have been recently transferred from DOD."

NASA will try to develop and use contractual sources capable of design, development, production and test of space vehicles and supporting services and products related to the successful

launching and operation of such vehicles.

NASA expects to negotiate contracts with educational institutions and other non-profit organizations for the conduct of specified research and development. Small business is also to be given an opportunity to take part to the maximum, consistent with NASA objectives.

### ARPA Wants to Speed Up Solid Rocket Development

With an eye for breakthroughs in solid propellant rocket work, Advanced Research Projects Agency has authorized Army, Navy and Air Force to negotiate with four top chemical companies for major research contracts.

"The achievement of breakthroughs in the solid propellant field," said ARPA Director Roy Johnson, "will have important bearing on many



Superalloy carrier/aircraft arresting gear is needed to withstand landing shock and jet blast. Photo shows how gear hangs down in jet exhaust blast.

critical programs which directly affect the deterrent capability and national security posture of this nation."

The four companies in the negotiations are American Cynamid, Dow Chemical, Esso Research and Engineering and Minnesota Mining and Manufacture. Initial contracts will be worth between one and two million dollars, but ARPA has congressional approval to spend \$20 million in this area.

Johnson said the long-range importance of the research contracts to the ballistic missile program for all ranges and to the Anti-ICBM program "cannot be overstated . . . Furthermore, solid propellants are becoming increasingly important in our national space programs. Their use in upper stage rockets is well-recognized; however, we have just begun to tap their effectiveness for space applications.

"We would hope that our national space programs of the future will be greatly benefitted by the returns of these contracts, and we look to the excellence of American industry to give use solutions which will mean much to the Free World."

### B-70 Likely to Carry Ballistic Missiles

The B-70 chemical bomber may be the first aircraft to carry and fire ballistic missiles, says Deputy Chief of Air Staff for Development Lt. Gen. Roscoe C. Wilson.

Wilson also told the recent Reserve Officers Seminar in Washington that a long-range, Mach 3 F-108 and a 400-mile Bomarc were likely. Both of these weapon systems would have atomic capability.

Speaking of present weapon capa-

### Battlefield Computers Developed for Army

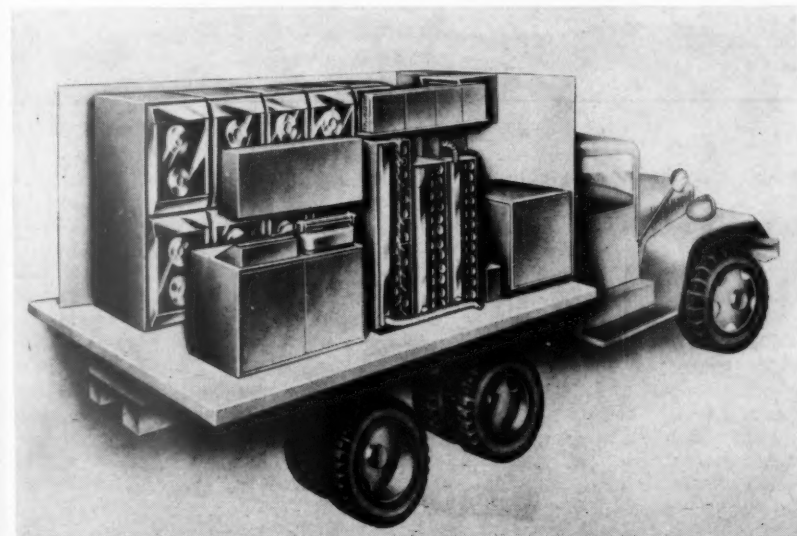
A completely automated, highly mobile combat computer and data processing system is being built for the Army by International Business Machines Corp. Purpose of the system is to aid data processing for commanders under battlefield conditions.

The rugged, mobile equipment will provide continuous information during battle on such changing conditions as intelligence, logistics support, fire power and troop strengths. The system will be built under a \$3.8 million

contract from the Army Signal Supply Agency.

One of the mobile units will receive, store and retrieve masses of battle data by remote electronic input and output. The second unit will be an experimental data processor to assist commanders in coordinating operations for a group of computers in a field Army.

The systems will be of modular construction, enabling easy replacement of assemblies and sub-units.



Designed to follow Army field elements is the ruggedized data processing equipment shown here in standard Army 2 1/2 ton-truck.



bilities, Wilson said that the B-58 would soon be operational, with 1300-mph speed, and a refuelled range "limited only by the endurance of the crew."

In the area of warning systems, Wilson confirmed reports that the DEW line, in addition to other systems, is being extended to provide greater coverage. He also said that 3,000-mile-range radars were in the offing which would give from 15 to 30 minutes warning of a ballistic missile attack.

## AF Moon Shot Fails; Army Gets Two Tries

After three less-than-successful shots at the moon, Air Force will turn the next two tries over to the Army. Army is expected to use a Jupiter C first stage in its moon vehicle.

Army will make its shots under technical direction of National Aeronautics and Space Agency, as did the AF. The final Air Force shot failed when its third stage did not fire. This stage had been tested only twice before the actual shot, and had fired once and failed once.

## Radar Technique Used In Refuelling Work

A new system for bomber/tanker rendezvous work has been announced by Bendix Aviation Corp. The system, based on radar, is presently being tested with B-58s and KC-135s.

Using beacons, the planes transmit and receive frequency coded signals that electronically provide range and bearing of each aircraft. The system is used up until the planes are within actual refuelling range.

## Airborne Heavy Cruiser Seen as Defense Weapon

A marriage of aircraft and missiles may be a future method of stopping attacking bombers, according to Deputy Chief of Naval Operations for Air VAdm. Robert B. Pirie.

Basis of the system would be subsonic aircraft depending on long cruising times, sophisticated early warning systems and fast air-to-air missiles. Asked Pirie, "Why must we bore supersonic holes in the air for air defense? A follow-on fighter concept is the answer."

"This concept exploits sophisticated long-range detection devices. It depends more on the high mach-speed ability of missiles to make the kill on attacking bombers. Such an aircraft



Prototype P3V-1 antisubmarine patrol plane flies over the Pacific. Based on the commercial turboprop Electra, the Lockheed plane will cruise nearly 100% faster than the present P2V-7 Neptune.

## Nike Hercules Tested, Successful at 100,000 ft.

The Nike Hercules has successfully intercepted and destroyed a target at an altitude of over 100,000 ft. The twenty-mile kill was scored at White Sands Missile Range, N.M.

Target for the test was a Navy-developed Pogo-Hi parachute-type target. The parachute is fired to altitude with a 13½-ft. rocket, and has a metallic coat which reflects radar signals.

## Air Force Uses TV To Cover Weapon Meet

All activities at the recent 10-day Air Force Weapons Meet at Tyndall AFB, Fla. were televised to judges and spectators. The TV coverage was programmed by Air Force working with Dage Television Division, Thomp-

son Ramo Wooldridge Inc.

This was the first time TV cameras had been used in modern military jet aircraft at supersonic speeds to record interceptor action. Pictures of the action were transmitted as much as 150 miles from the competing aircraft to receivers located in the base area.

Drone firings, interceptor approaches and all other action was picked up by the transistorized TV sets, which were carried in F-102 and TF-102 jets.

## Industry Developments

### Space Hydraulics Studied At Republic Aviation

"Substantial progress in beating the heat barrier, still one of the knottiest problems facing manned space flight" has been reported by engineers at Republic Aviation Corp. The area of progress is in space hydraulics.

Goal of the Republic studies is a hydraulic system which will function smoothly at temperatures ranging from 20°F to 1000°F. According to Dr. William O'Donnell, Chief Republic Scientist, manned space vehicles re-entering the earth's atmosphere will be subjected to temperatures up to 3000°, with internal components heated to 1000°.

Although the Republic scientists have successfully developed systems that work at these high temperatures, there is still "need for a system which functions as well below freezing as it does at the re-entry temperature." Republic is presently working with such materials as tungsten, carbide and sapphire in a search for heat resistant substances.

Said O'Donnell, "Solution of the 1000-degree hydraulic system will be a big step in advancing space and hypersonic flight, but there are other

problem areas . . . Among those we will be tackling . . . are pilot environment, electronics and guidance systems, high temperature fuel systems and basic construction systems."

## Increased Computer Use In Management Predicted

A growing future use of large-scale computers in making management decisions was recently predicted by Prof. Wassily Leontief, Harvard Director of Economic Research.

Addressing a luncheon convention of the Univac Users' Conference in Boston, Leontief said that present computers are performing familiar tasks faster and more efficiently. In the future, he said, there will be a trend to computer work in connection with physical operations planning, cost analysis and market analysis.

"Problems of inventory management, transportation scheduling and still more complicated questions of work scheduling, production planning and cost accounting are clearly earmarked as a potentially fruitful field for the

use of high-speed, large-scale computers," he said.

Said Leontief: "The same methodical approach which will advance the use of large-scale computers in the solution of problems confronted by modern business will necessarily lead to a gradual merging of these separate solutions into a larger whole."

## Republic to Probe Mach 5 Coatings

Protective coatings for advanced aircraft, spacecraft and missile skins will be studied by Republic Aviation Corp. under a recent \$134,000 contract let by the Air Force.

Experiments under the contract will evaluate abilities of various coatings to radiate heat at the 2400°F temperatures generated by Mach 5 flight. Under study are materials ranging from paint to chemical film.

At the high speeds under study, excessive powerplant and friction heats often cause expansion, contraction or corrosion of structural components in the aircraft, spacecraft or missile.

## Polaris Personnel Trained by Lockheed

The men who will operate Navy's Polaris submarine launched IRBM are being trained now—and will be ready to go when the missile is. Navy specialists are now taking intensive maintenance and operations training at Lockheed Missile System's Sunnyvale, Calif. plant.

Six officers and 78 enlisted men are

currently studying such aspects of the missile as flight control, telemetering, structures handling, propulsion, guidance, fire control, launching and handling. After one week of classroom work, the trainees receive on-the-job instruction at Lockheed's plants. For those working with the Polaris propulsion system, training is being conducted at Aerojet-General; launching systems, Westinghouse Electric Co.; fire control, General Electric Co.



Lockheed Missile Systems Division trains missilemen to be ready when the Polaris Fleet Ballistic Missile is completed.

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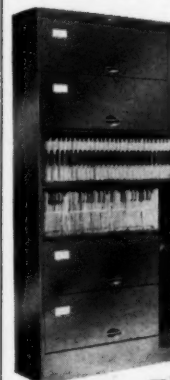
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## Index of Advertisers

ACF Industries .....	Cover 2
Air Transport Association ..	Cover 3
American Bosch Arma ...	Cover 4
Belco Div., Miller Mfg. Co. .	44
Continental Aviation & Engineer- ing .....	2
Egypto Div. ....	44
Government Employees Insur- ance Co. ....	28
Graphic Systems, Inc. ....	41
Hamilton Management Corp.	32, 39
Keystone Co. ....	39
Lockheed Aircraft .....	1
Management Control Charts Co.	43
Radio Corporation of America .	7
Tab Products Co. ....	47
Wassell Organization, Inc. ....	32, 41, 43, 47, 48
<b>Classified</b>	
Collins Engineering Co. ...	48

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## Rundown of Key Contracts

### ARMY

\$2.7 million in two contracts to North American Aviation, Inc., for rocket engines.

\$1.5 million to Telecomputing Corp., for testers.

\$1.2 million to J. W. Bateson Co., Inc. for construction of guidance building, antenna foundation and transmitter building at White Sands Missile Range.

\$2.7 million to Lockheed Missile Systems Division for additional flights of Kingfisher target missiles.

### NAVY

\$79 million to Douglas Aircraft Co. for production of A4D-2N Skyhawk Aircraft, the third version of the A4D.

\$80 million to Bath Iron Works for guided missile frigate, DLG-16.

\$49 million to New York Shipbuilding Corp. for guided missile frigates.

\$25 million to the Puget Sound Bridge and Dredging Co. for guided missile frigates.

\$26 million to Todd Shipyards Corp. for guided missile frigate.

\$2 million to Universal Match Corp. for engineering and coordination of Terrier guided missile launch equipment.

\$8.2 million to Lockheed Aircraft Corp. to install Julie and Jezebel systems in 92 P2V aircraft.

\$17.6 million to Applied Physics Laboratory, Johns Hopkins University for continued research and development in connection with the Bumblebee program.

\$20 million to Ryan Aeronautical Co. for automatic aircraft radar navigation equipment.

### AIR FORCE

\$6.4 million to Radio Corp. of America for ground electronics.

\$1.4 million to Aeroproducts Division, General Motors Corp. for modification and repair of miscellaneous propeller components.

\$1.7 million to Eastman Kodak for various types of aerial film with trailer and leader.

\$3.2 million to Benson Manufacturing Co. for production external, jettisonable fuel tanks for the B-52.

\$22.8 million to Burroughs Corp. for an additional 32 data processing systems in the SAGE air defense program.

\$4.5 million to Massachusetts Institute of Technology for research studies related to re-entry physics and instrumentation radar.

\$1.3 million to Sperry Rand Corp., Sperry Gyroscope Co. Div. for microwave command guidance equipment, range and tracking test sets, radar sets, services and data for the XQ-4A drone.

\$2.4 million to Ryan Aeronautical Co. for development of an advanced version of the Q-2C Firebee drone.

\$12 million to General Electric Co. to rebuild 165 jet engines a month for the next twelve months.

\$1.2 million to Boeing Airplane Co. for KC-135A flight simulators, spare parts, special tools, installation service and data.

\$13.4 million to The Martin Co. in letter contract as part of a \$33-million contract for Mace missiles, ground support equipment and related items.

\$1.4 million to Hughes Aircraft Co. for in-service engineering services on Hughes-designed systems.

\$1 million to United ElectroDynamics, following an earlier contract for design and development of a transistorized missile telemetry system.

\$4.5 million to Bendix Systems Div., Bendix Aviation Corp. for Phase I work on weather reconnaissance subsystems.

\$52 million to Boeing Airplane Co. for KC-135A aircraft, spare parts, ground support equipment and related equipment.

## ADVANCED RESEARCH PROJECT AGENCY

\$9 million, let through Air Force to United Aircraft Corp. for design and development of a liquid-fueled, high energy, upper stage rocket engine.

ARMED FORCES MANAGEMENT



# New Products

## Lead Items This Month

(For more information, see advertisers' index)

### New Literature

**Equipto.** Manufacturer of steel shelving, slotted angle, bins, drawer units, lockers, carts, benches is offering to interested persons a free copy of its new idea book No. 299. Books published by its slotted angle division, is filled with application suggestions for Equipto angles.

For more facts request No. 100 on reply card.

### New Filing Idea

**Tab Products Co.** New Space-finder Files are reported to save 50 percent or more filing time, space, money in hundreds of government offices. Twenty-four page brochure is available describing visibility, other Space-finder advantages.

For more facts request No. 101 on reply card.

### Inventory Control

**Wassell Organization, Inc.** Lists 16 reasons why you should be cutting costs and speeding efficiency with the simplified inventory control, Sig-na-lok. Visible control puts inventory at your fingertips.

For more facts request No. 105 on reply card.

### Boardmaster Control

**Graphic Systems.** This firm reports men interested in efficient management can get things done with Boardmaster Visual control which gives a graphic picture of operations, spotlighted in color, saves time, money, and stops errors.

For more facts request No. 102 on reply card.

### How to Use

#### AFM Prepaid Reply Card

In this issue, a postage free card is provided for your convenience in requesting descriptive and informative literature. This will be forwarded to you, without obligation. Many cost saving ideas are generated by Operating Departments that have information on products available. Purchasing Officials will find this type of information invaluable. Just fill in name, address, circle number required and mail. Descriptions sent to AFM direct from the supplier.

### Visual Control Board

**Wassell Organization, Inc.** Producing not only schedules but automatically checks with time, line, and color control, has low original and up-keep cost.

For more facts request No. 111 on reply card.

### Replacement Faucet Stems

**Miller Manufacturing Company.** Reports leaking compression-type faucets, lost water and excessive maintenance costs are gone forever with the installation of Belco ball bearing replacement stems, complete with bibb washers.

For more facts request No. 106 on reply card.

### Management Guide

**Wassell Organization, Inc.** Every management executive concerned with defense production will want a copy of this new 40-page book of ideas for greater productivity at lower cost—just issued by the makers of Pro-duc-Trol for production control.

For more facts request No. 103 on reply card.

### Organization Chart

**Management Control Charts Co.** A typist, a typewriter and typing paper are all that is needed to keep this interchangeable organization chart up to date. The chart comes in any size, and uses photographs for sharp prints. It is a handy training aid, and has completely moveable and reusable parts. It is extremely easy to change, and eliminates

costly re-drafting of other types of organization charts.

For more facts request No. 104 on reply card.

### Visual Control Board

**Wassell Organization, Inc.** The new Vu-board, which shows all important data, sets up and operates easily, has unlimited uses for scheduling, charting, dispatching, etc., is offered at low cost by this firm.

For more facts request No. 108 on reply card.

### Filing System

**Wassell Organization, Inc.** For modern secretaries, firm reports Corres-file brings all important papers to her fingertips, cuts time in half, saves costly labor, increases efficiency, doubles capacity without sacrificing space.

For more facts request No. 107 on reply card.

## New Services

### Investments

**Hamilton Management Corp.** Through Hamilton Funds, Inc., a managed common stock investment fund, this firm offers lump sum or monthly investment plans to fit any budget. Interested persons can inquire without obligation. Firm recently declared another quarterly dividend.

For more facts request No. 109 on reply card.

### Capital Growth Fund

**Keystone Fund of Canada, Ltd.** Eastern investment firm offers capital growth long-term investment in the expanding Canadian economy.

For more facts request No. 110 on reply card.

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## Other New Products

### Operations

**LIFT TRUCK CIRCULAR:** A new circular describing the first narrow-aisle rider-type electric tiering truck with a 24-volt electrical system is available free from Lewis-Shepard Products, Inc. The 7-page, 2-color presentation contains complete operating and maintenance details on the recently-introduced Lewis-Shepard 24-volt Model "MN" truck. Available in capacities of either 2000 or 3000 lbs., the 24-volt Model "MN" maneuvers and high stacks goods in aisles as little as 6-feet wide when carrying a 40-inch long load.

For more facts request No. 10 on reply card.

**GUN DRILL CATALOG:** A new four-page, two-color, profusely illustrated, 8½ by 11-in., three-hole-punched, catalog (SC-110) describing Starbore carbide gun drills for high speed production of precision holes from the solid is now available from Star Cutter Co. The catalog describes a line of gun drills that produce smooth, precision through-holes in cast iron, aluminum, bronze and some steel parts. The efficient, long-life tools combine the features of an oil-flute drill and a trepanning tool to produce a small pin during the cutting process.

For more facts request No. 11 on reply card.

**DRUM STORAGE RACKS:** GRIZZLY Drum Storage Racks hold 4 or 6 drums in readily accessible positions, designed for loading ease from front or back. Self-standing units, do not require anchoring to floor. Can be moved with fork trucks fully loaded. Drain height from floor to spigot—bottom row 18 inches, top row 48 inches. Come in 2 models—No. DS-4, 60 inches wide x 36 inches deep x 46 inches high; No. DS-6, 84 inches wide x 36 inches deep x 46 inches high.

For more facts request No. 12 on reply card.

**ELEVATING TAILGATES:** H. S. Watson Company now offers a complete line of new "Weightlifter" elevating tailgates for pickups, on through ¾ to 2-ton trucks with stake or van bodies. The "Weightlifter" is electric-hydraulic, and has a choice of 1,000, 1,100, and 1,300 lbs. capacities, so as to suit job requirements and different chassis. Power platform closing

to the vertical riding position is standard on the 1100 and 1300 models. One control lever—and one hydraulic cylinder—controls all functions of the tailgate, with a "safety control stop" built in as standard.

For more facts request No. 13 on reply card.

**BATTERY CHARGER:** A battery charger of special interest to the automotive trade, marine, and general industry has been announced by Fox Products Co. In addition to handling standard 6 and 12 volt car, bus and truck batteries, the new Model 588 Supercharger can be used for 8, 16, and 24 volt batteries. It charges highway equipment, military vehicles, boats and industrial handling equipment. The SUPERCHARGER's output is 100 amps into 6v batteries. The super silicon rectifier carries a five-year guarantee. Push-button and lever switch permit 12 different charging rates. Control is by a 6-hour electric timer, coded for proper charging time.

For more facts request No. 17 on reply card.

### Scientific

**TIME DELAY RELAY:** A dependable Time Delay Relay, factory preset to give delay times from 50 milliseconds to 50 seconds, has been designed for airborne or ground use, and offers instantaneous recycling. The Master Specialties Co. unit has a transistor control circuit, with a relay contact as the only moving part. Miniature, and weighing 4 ounces, this Time Delay Relay is accurate from 18 to 32 VDC, and -55°C to +71°C. The hermetically sealed unit was designed in accordance with military specifications, and uses printed circuit construction. It will withstand exceptional shock and vibration.

For more facts request No. 14 on reply card.

**ROTARY ACTUATOR:** The Hoover Electric Company announces the production and availability of a new model D-1900 Rotary Actuator for a wide range of applications in aircraft, missiles and ordnance equipment. This unit operates under a normal load of 8 inch pounds at 1,000 rpm. Use of the next larger size Hoover standardized motor permits loads to 30 inch pounds at 200 rpm. An adjustable travel limit mechanism permits up to 250 turns of the output shafts. Higher total output turn ranges are available.

For more facts request No. 15 on reply card.

**RADOME AIR CONDITIONER:** Ellis and Watts Products, Inc. has recently announced development of a MIL-AC Model

41 Air Conditioning Unit to control temperature and humidity inside Radome Shelters. The unit automatically controls the temperature in a Radome to within ±½°F. with continuous dehumidification under varying internal load conditions. Normally mounted outside the Radome on a concrete pad, the MIL-AC 41 Unit is specifically designed for continuous outdoor operation in ambient temperatures ranging from minus (—) 65°F. to plus (+) 130°F. The MIL-AC 41 is a compact, self-contained unit with a capacity of 75,000 BTU's at 120°F. outside conditions. The unit is only 36" high, 100" long and 38" wide.

For more facts request No. 16 on reply card.

**MILLIVOLTMETER CONTROLLER:** A tubeless current-proportioning millivoltmeter controller has been developed by Brown Instruments Division of Minneapolis-Honeywell Regulator Company to control current input to saturable reactors, radio frequency generators and power amplifiers. The Py-O-Volt controller, featuring fail-safe design and using a magnetic amplifier instead of tubes, has a built-in voltage regulator and plug-in control and measuring units. A continuous output of 1 to 5 milliamperes into 4,000 ohms or more, when used as the input to magnetic amplifiers, provides control of saturable core reactors up to 100 KVA.

For more facts request No. 18 on reply card.

**MATHEMATICS AID:** Useful to engineers, architects, teachers, accountants, and businessmen generally is a new 224 page book of ingenious tables called the "Math-O-Matic." The volume makes short work of tough problems in multiplication, division and percentage. It also solves at a glance many intricate problems in square root, cube root, logarithms, etc. Included are reciprocals and pi products of all numbers from 1 to 1000.

For more facts request No. 19 on reply card.

**MINIATURE HEXAGONAL CONNECTOR:** This space-saving miniature connector has been designed for use in small electronic instruments, portable field equipment and aircraft. Fast, easy disconnect and positive polarization are only two features that add to the reliability of Continental Connector's new Series C-18 hexagonal connectors. Plug and receptacle are available in four, five and seven precision machined contacts of phosphor bronze and brass. Current carrying parts are gold plated over silver. Hoods are available with or without cable clamp, and screw down over plug or socket.

For more facts request No. 20 on reply card.

**LIGHTWEIGHT BELLWS:** The Hydrodyne Corporation has announced development of a new process for making bellows without a drawing or forming operation. The advantages of Hydrodyne bellows include controlled wall thickness . . . to concentrate or "machine in" thickness or strength where stress is to be the greatest. It eliminates failure due to fatigue. Some aluminum bellows have been tested for 100,000,000 cycles without fatigue. It has low force requirements for axial or angular flexing with highly predictable performance. Bellows with rated pressures of over 3,000 psi are being made. Sizes from ¼" to more than 60" in diameter are available. Extensive tooling is not required so that rapid deliveries can be accomplished. Complete research and development services are available.

For more facts request No. 23 on reply card.

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26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75
76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125
126	127	128	129	130	131	132	133	134	135	136	137	138	139	140	141	142	143	144	145	146	147	148	149	150
151	152	153	154	155	156	157	158	159	160	161	162	163	164	165	166	167	168	169	170	171	172	173	174	175
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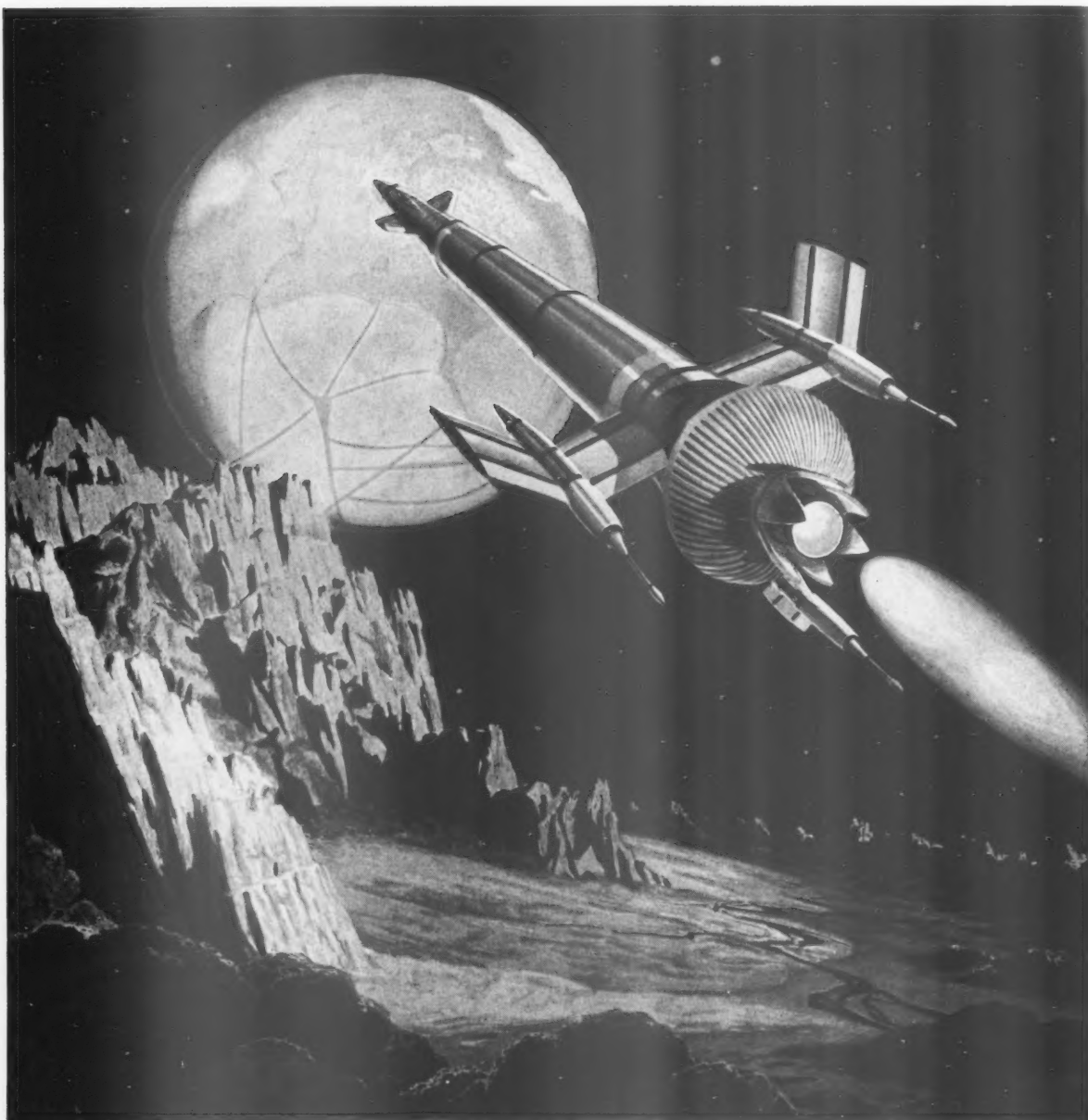
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## Mars Snooper

This nuclear-fueled reconnaissance craft is preparing to land on Mars' outermost satellite, Deimos—12,500 miles away from the "red planet" (center) and 35 million miles away from the Earth. Deimos' gravitational pull is so slight that a featherlight landing could be made, and a take-off could be accomplished with little more than a shove of the pilot's foot! (At Deimos' orbital speed, such a push would start the ship back to Earth at 3000 miles per hour.)

Our spaceship is designed to fly in two directions—nose first as a space rocket and tail-first as a ramjet airplane. Propulsion for both is provided by a single

atomic heat source, reacting with hydrogen for rocket thrust, and with atmosphere to power the ramjets.

Travel to Mars, braking for landing, take-off and re-entry are accomplished by rocket-thrust. As the ship approaches the Earth's atmosphere, it assumes a tail-first attitude. The "petal doors" enclose the rocket nozzle, and the ship is transformed into a high speed, ramjet airplane with M-shaped wings. Control fins are located in the nose of the craft, near the crew's quarters.

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